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## Estimated Discard and Catch of Groundfish Species in the 2017 US West Coast Fisheries



Kayleigh A. Somers  
Jason Jannot  
Kate Richerson  
Vanessa Tuttle  
Neil B. Riley  
Jon T. McVeigh

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NWFSC Observer Program  
National Marine Fisheries Service  
Northwest Fisheries Science Center  
Fishery Resource Analysis and Monitoring Division  
2725 Montlake Blvd E  
Seattle, WA 98112

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## Executive Summary

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The primary objective of this report is to estimate fishing mortality of groundfish species in US west coast fisheries during 2017 and evaluate mortality estimates relative to Annual Catch Limit (ACL), Acceptable Biological Catch (ABC), and Overfishing Limit (OFL) harvest management goals. These management goals are published in the federal groundfish regulations for selected groundfish species (50 CFR 660 Subpart C, 80 FR 212). Based on a recommendation from the Pacific Fishery Management Council's (PFMC) Scientific and Statistical Committee (SSC), we present groundfish mortality estimates by species, whenever possible (PFMC 2014). Our primary findings include that:

- We report discard estimates from three newly observed fisheries: Pacific halibut derby, CA ridgeback prawn trawl, and CA sea cucumber trawl.
- Three groundfish groupings exceeded 2017 harvest goals by 103% of the ACL for black rockfish (Oregon), 108% of the ACL for cabezon (Oregon), and 102% of sablefish north of 36° N. latitude.
- Additionally, the estimated fishing mortalities of two groundfish species were between 90 and 100% of their ACLs: petrale sole (94%) and yelloweye rockfish (90%).
- All other groundfish species or complexes achieved less than 90% of their ACLs.
- Only two species remain PFMC-defined as rebuilding: cowcod rockfish south of 40°10' N. latitude and yelloweye rockfish. The ACL percentages increased for both of these species; cowcod increased from 13 to 17%, while yelloweye rockfish showed a much greater increase, from 50 to 90%.
- Twenty-nine of the groundfish species or complexes (71%) had fishing mortality estimates which were less than 50% of 2017 ACL harvest goals (Table 16).
- Fishing mortality estimates for all groundfish catch combined were higher in 2017 relative to 2016 in the at-sea hake catcher-processor (CP) and mothership catcher-vessel (MSCV), catch shares pot and bottom trawl, and open access (OA) fixed gear sectors (Table 15, Somers et al. 2016). Estimated fishing mortality of all groundfish species and complexes were lower than 2016 levels in the catch shares hook-and-line, sablefish primary, nearshore, and pink shrimp sectors.

Summaries of 2017 catch from the following groundfish fishery sectors are included:

Commercial -

Shore-based Individual Fishing Quota (IFQ) Program\*

LE trawl permits – fishing bottom trawl gear

LE trawl permits – fishing fixed gear

LE trawl permits – fishing midwater trawl gear, landing 50% or more rockfish

LE trawl permits – fishing midwater trawl gear, landing 50% or more hake

LE trawl permits – fishing bottom trawl gear and using electronic monitoring (EM)

LE trawl permits – fishing fixed gear and using EM

LE trawl permits – fishing midwater trawl gear, landing 50% or more rockfish and using EM

LE trawl permits – fishing midwater trawl gear, landing 50% or more hake and using EM

At-sea Hake Co-op Programs\*

Pacific hake CP

Pacific hake MSCV

OA fixed gear nearshore (Oregon/California)\*

Fixed gear LE sablefish primary season (tier endorsed)\*

- Fixed gear LE non-primary sablefish (non-endorsed and daily trip limit sectors)\*
- Pacific halibut derby\*
- Fixed gear OA daily trip limit\*
- Exempted fishing permit (EFP) (not including EM sectors listed above)\*
- Tribal –
  - Shoreside hake
  - At-sea hake\*
- Non-commercial –
  - Recreational (Washington/Oregon/California)
  - Research
- Other non-groundfish fisheries included with incidental catch of groundfish species:
  - Commercial -
    - OA pink shrimp trawl (Washington/Oregon/California)\*
    - OA ridgeback prawn trawl (California)\*
    - OA bottom trawl targeting California halibut\*
    - OA bottom trawl targeting sea cucumber (California)\*
    - OA bottom trawl
    - Other gear groups - not trawl, pink shrimp or ridgeback trawl, or fixed-gear
    - Fixed gear targeting non-groundfish

\* indicates sectors that use federal observer data

## Data Sources

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Data sources used to estimate groundfish fishing mortality include landing receipts, onboard observer records, EM logbooks, and recreational and research catch information.

Fleet-wide landing receipts (a.k.a. fish tickets) are the cornerstone of retained catch information for all shoreside sectors of the commercial groundfish fishery on the US west coast. Fish tickets are trip-aggregated sales receipts issued to vessels by fish-buyers in each port for each delivery of fish. State agencies provide them to fish-buyers, who return them to the agency for processing. Washington, Oregon, and California each have a slightly different fish ticket format. Each state conducts species-composition sampling for numerous market categories reported on fish tickets. Market categories represent either a single species or a mixture of species. Fish ticket and species-composition data are submitted by state agencies to the Pacific Fisheries Information Network (PacFIN) regional database, which is maintained by the Pacific States Marine Fisheries Commission (PSMFC). For analytical purposes, we used fish ticket data with PacFIN-applied percentages of each species weight within market categories obtained from species composition sampling. Landed weights from sampled market categories were distributed to individual species whenever possible.

Fish ticket landings data for the calendar year 2017 were retrieved from the PacFIN database on May 3, 2018. The allocation of these landings to unique fishery sectors has been improved to better reflect the sectors as defined for observer coverage (Figure 1, Appendix B). Specifically, three sectors were observed for the first time in 2017: the Pacific halibut derby, CA sea cucumber trawl, and CA ridgeback prawn trawl fisheries. These sectors are now defined separately from “Incidental” fisheries, unlike in previous years. In addition, beginning in 2017, vessels participating in the sablefish primary fishery were, on the trip where they exceeded their annual sablefish tier quota,

allowed to land any additional sablefish as part of the daily trip limit (DTL) fishery<sup>1</sup>. In 2017, these DTL landings as part of primary trips comprised a total of 6.3 gross mt, or ~0.4% of total sablefish landings in the primary fishery. Due to the small magnitude of these landings and the likelihood that this effort was more similar to the sablefish primary than the DTL sector, we considered all fish tickets and observed data associated with those trips as part of the sablefish primary fishery. All additional data processing steps are described in the methods section below.

Discard is defined in this report primarily as catch which is discarded at-sea; however, some estimates of additional “discard” occurring shoreside in optimized or maximized retention are included and explicitly labeled. In all others sectors, the West Coast Groundfish Observer Program (WCGOP) assumed that the small amount of discard at the dock is accounted for in PacFIN fish ticket landings data. Landing weights are presented in round weight (complete weight as caught, prior to any dressing), as any conversion factors (e.g. for at-sea processing) have already been applied by state agencies or in PacFIN.

Discard estimation focused on commercial groundfish fishery sectors with scientific at-sea observations of discards conducted by the Fishery Observation Science Program, Fishery Resource Analysis and Monitoring Division (FRAM), Northwest Fishery Science Center (NWFSC). The WCGOP and the At-Sea Hake Observer Program (A-SHOP) observe distinct sectors of the groundfish fishery. The WCGOP observes a number of different sectors of the groundfish fishery, including IFQ shore-based, LE and OA fixed gear, Pacific halibut derby, and state-permitted nearshore fixed gear sectors. The WCGOP also observes several fisheries that incidentally catch groundfish, including the pink shrimp, CA halibut, CA ridgeback prawn, and CA sea cucumber trawl fisheries. We estimate discards in the Pacific halibut derby, CA ridgeback prawn, and CA sea cucumber trawl fisheries for the first time in this report. WCGOP data from each of these fisheries were used for the purposes of discard estimation. Mortality estimates were summarized from the A-SHOP data for the CP and MSCV sectors of the at-sea Pacific hake fishery. No tribal fishing in the at-sea hake fishery occurred in 2017.

The NWFSC WCGOP program was established in 2001 by NOAA Fisheries (National Marine Fisheries Services (NMFS)) (66 FR 20609). All commercial vessels that land groundfish caught in the US Exclusive Economic Zone (EEZ) from 3-200 miles offshore are required to carry an observer when notified to do so by NMFS or its designated agent. Subsequent state rule-making also requires vessels that fish for groundfish within 3 miles of shore or participate in other state-managed fisheries to carry federal observers when notified.

The WCGOP’s goal is to improve total catch estimates by collecting information on west coast groundfish species discarded at-sea. Detailed information on data collection methods employed in each observed fishery can be found in WCGOP manuals (NWFSC 2018b). The sampling protocol employed by the WCGOP is primarily focused on the discarded portion of catch. To ensure that recorded weights for the retained portion of the observed catch are accurate, haul-level retained catch recorded by WCGOP observers are reconciled with trip-level fish ticket records. The WCGOP data are linked to fish tickets by fish ticket identification numbers obtained by the observer and are adjusted so that the total trip pounds of retained catch in the WCGOP data equal the total trip pounds on the fish ticket(s). This adjustment is necessary because observer retained catch weight estimates in the trawl sectors often consists of the visual estimate used in the vessel’s logbook, while the fish ticket weight is a physical measurement and is legally binding<sup>2</sup>.

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<sup>1</sup> [http://www.westcoast.fisheries.noaa.gov/publications/fishery\\_management/groundfish/public\\_notices/compliance-guide-sablefish-e-tickets.pdf](http://www.westcoast.fisheries.noaa.gov/publications/fishery_management/groundfish/public_notices/compliance-guide-sablefish-e-tickets.pdf)

<sup>2</sup> For more details see: [http://www.nwfsc.noaa.gov/research/divisions/fram/observation/data\\_processing.cfm](http://www.nwfsc.noaa.gov/research/divisions/fram/observation/data_processing.cfm)



The A-SHOP has conducted observations of the west coast at-sea hake (a.k.a. Pacific whiting, henceforth referred to as hake) fishery since 2001. Prior to 2001, observer coverage of the west coast at-sea hake fishery was conducted by the North Pacific Observer Program. Current A-SHOP program information and documentation on data collection methods can be found in the observer manual (NWFSC 2018a). The at-sea hake fishery has mandatory observer coverage, with each vessel over 38 meters carrying two observers. Beginning in 2011, under IFQ/Co-op Program management, all catcher vessels that deliver catch to motherships are required to carry WCGOP observers or EM systems.

At-sea discard of IFQ species was recorded by EM systems on those vessels fishing IFQ quota within the EM EFP in 2017. Estimates of discard weight by IFQ species or grouping at the haul level for shoreside vessels were provided by the PSMFC and are used in this report.

For all PacFIN, WCGOP, A-SHOP, and PSMFC data, we maintain confidentiality of persons and businesses, as required by the Magnuson-Stevens Fishery Conservation and Management Act (often referred as Magnuson-Stevens Acts or MSA), which was most recently reauthorized in 2007<sup>3</sup>. NOAA Fisheries guidance recommends, and the NWFSC Fisheries Observation Science (FOS) Program follows, the “rule of three,” which states that, “Information from at least three participants in the fishery must be aggregated/summarized at a temporal and spatial level to protect not only the identity of a person or a business, but also any business information.”

Groundfish species catch from the recreational fisheries come directly from the Washington Department of Fish and Wildlife (WDFW), the Oregon Department of Fish and Wildlife (ODFW), and the California Department of Fish and Wildlife (CDFW). State agencies provide catch weight (discarded and retained) estimates with PFMC-approved mortality rates applied to account for discard mortality (PFMC 2014). WDFW include only surface-release mortality rates for released rockfish; ODFW and CDFW apply depth-dependent mortality rates.

Each year, a certain portion of the ACL for groundfish species is harvested through research activities. Research programs that caught groundfish included the NWFSC’s groundfish bottom trawl survey and sablefish tagging and collection research and the International Pacific Halibut Commission’s (IPHC) survey. Total groundfish research catch (discarded and retained) information was provided by NOAA’s West Coast Regional (WCR) Office and compiled by FOS analysts. Catch varies by research permit, including but not limited to: catch from permits with only retained catch, tagging study catch where all fish were released alive, and combined discarded and retained catch. In this report, depth-dependent mortality rates (PFMC 2016b) were applied to canary and yelloweye rockfish discards caught using fixed gear and released at depth, where data was available.

In addition to these data sources, estimates of discard mortality rates were provided by the PFMC Groundfish Management Team (GMT) (PFMC 2014, PFMC 2016b, PFMC 2017). The GMT is an advisory body to the PFMC that is comprised of representatives from federal, state, and tribal agencies and is involved in evaluating management performance and alternatives for groundfish fisheries on the west coast of the US, between the Canadian and Mexican borders. For the purposes of this analysis, the GMT provided discard mortality rates, which estimate the survival of discarded catch: for big skate in trawl sectors only; for sablefish, longnose skate, and lingcod in trawl and fixed gear sectors; for spiny dogfish in hook-and-line fixed gear sectors only; and for some individual species and major species groups reported in the state-permitted fixed gear nearshore sector (for all discard mortality rates, see Tables A-3 and A-4 or PFMC 2016b). Trawl mortality rates have only been generated for bottom trawl gears and therefore were only applied to discard estimates generated from bottom trawl gear. We assume 100% mortality for all species caught with midwater, shrimp, prawn, and sea cucumber trawl gear, because species-specific mortality

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<sup>3</sup> [http://www.fisheries.noaa.gov/sfa/laws\\_policies/msa/documents/msa\\_amended\\_2007.pdf](http://www.fisheries.noaa.gov/sfa/laws_policies/msa/documents/msa_amended_2007.pdf)

rates have not been identified for these gear types. Changes to estimation, discard rates, and management are documented in Table A-5.

## Methods

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### Discard Estimation Methods Overview

We used a deterministic approach to estimate discard mortality for all WCGOP-observed sectors of the groundfish fishery. Observed discard rates for each species were expanded to the fleet-wide level to estimate total discard amount. Due to differences in data availability and management structure among sectors of the groundfish fishery, expansions were applied with minor differences between fishery sectors, as described below.

The stratification scheme used in this analysis is inconsistent with the sampling design employed by the WCGOP. The overall WCGOP sampling design is based on a stratified multi-stage random sampling. This design-based framework distributes observational effort more evenly coast-wide than simple random sampling, and uses prior landings information to improve the efficiency of sampling allocation. Strata employed in this report provide mortality estimates that are relevant to the spatial and temporal structure of groundfish management. The validity of stratification in terms of isolating variance in discard has not been rigorously tested. Until more work can be completed to evaluate which strata (area, depth, season, etc.) are most appropriate for discard analyses, broader stratification is often warranted to ensure adequate sample size and/or to meet confidentiality mandates.

In addition to standard error (SE), we have provided the coefficient of variation (CV) of the discard ratio for each species (or species group) as another measurement of statistical uncertainty. Although the confidence intervals (CIs) for the estimated discards can be derived from SEs based on normality assumption, we do not provide these statistics in the current report, because preliminary analyses indicated that the upper bounds of CIs for rare species could be underestimated. We calculated the SE of the observed discard ratio for each fish species, as described in Pikitch et al. (1998). The SE of the discard ratio was then divided by the discard ratio itself to calculate the CV. Within a given stratum, the CV of the discard ratio of a fish species is identical to the CV of the expanded discard estimate of the given species (Lee 2015). Thus, it can serve as a very informative statistic for discard estimates. In addition, the differences in the magnitude of discarded amounts among the species make the CVs, which are unitless, more useful for comparisons when the estimates of many species are presented in one table.

In all cases where an FMP groundfish species grouping, nearshore species grouping, or unsampled catch category was used to compute discard ratios, any retained weights that were recorded by the observer but that did not appear on fish tickets were excluded from the denominator. This was necessary to prevent double-counting associated with differences in the species codes used by observers and processors. For instance, while observers may record rockfish catch at the species level, various species of rockfish are often grouped, weighed, and recorded together on the fish ticket under a grouped species code (e.g., NUSP = Northern Unspecified Slope Rockfish). When using a single species in the denominator, (e.g., sablefish in the fixed gear fisheries), any retained weights in observer and fish ticket data that share the same species code will match and adjust properly.

Species were defined and grouped for this report according to the WCGOP Data Processing Appendix (Table A-1). The Groundfish Fishery Management Plan (FMP) provides a complete listing of groundfish species (PFMC 2016a).

As with all point estimates, mortality values presented in Tables 15 and 16 should be considered with caution. Multiple sources of uncertainty that were not accounted for in this analysis might influence mortality estimates, including species composition sampling of landed catch, observed retained weights, and discard mortality rates.

In all tables, (--) was used when there is no actual numeric value (i.e., the species was not caught). Values appear as 0 when a value exists but is smaller than the decimal places allotted. Grey shading indicates that values include estimates of both discard and retained catch. Rebuilding species are capitalized.

## **IFQ Fishery Discard Estimation**

The IFQ/Co-op managed groundfish catch share fishery operates with a variety of gear types and target strategies, which depend on where catch is delivered and processed.

Catch delivered to shore-based processors (IFQ):

- Bottom trawl: Bottom trawl nets used to target a variety of groundfish species.
- Midwater rockfish trawl: Midwater trawl nets used to target midwater non-hake species, such as widow and yellowtail rockfish.
- Midwater hake trawl: Midwater trawl nets used to target hake.
- Pot: Pot or trap gear used to target groundfish species, primarily sablefish.
- Hook-and-line: Longlines primarily used to target groundfish species, mainly sablefish.

Catch processed at-sea (Co-op Program):

- MSCV: Midwater trawl nets used to target hake. Catcher vessels deliver unsorted catch to a mothership, where it is sorted and processed.
- CP: Midwater trawl nets used to target hake, which is processed at sea.

In 2011, the implementation of the IFQ management program resulted in changes to fishing regulations which, in turn, resulted in development of new methods for estimating fishing mortality under the IFQ fishery. For example, in the non-hake IFQ sectors:

- Vessels must carry NMFS observers or EM systems (if participating in the EM EFP) on all IFQ fishing trips.
- If participating in the EM EFP and fishing bottom trawl or fixed gear, vessels must carry NMFS observers when notified to do so.
- Observer sampling priorities were shifted to focus more on IFQ and rebuilding groundfish species.
- The use of multiple gear types (trawl or fixed gear) were allowed for fishing under a Federal groundfish trawl-endorsement permit, although only one gear type is allowed per trip.
- A limit of one IFQ reporting area could be fished per trip.
- IFQs were established for a subset of groundfish managed under the FMP.

## **Shore-based IFQ Sectors**

Fleet-wide discard estimates for the shore-based IFQ sectors were derived from WCGOP observer data, PSMFC EM data, and PacFIN fish ticket landings data (Figure 1). Fish tickets associated with the IFQ fishery were defined by analysts through an extensive quality control and review process of all available data sources, including those utilized for in-season management.

IFQ bottom trawl vessels can hold a California halibut bottom trawl permit and participate in the state-permitted California halibut fishery. These LE California halibut tows can occur on the same trip as tows targeting IFQ groundfish and were identified at the tow-level based on the use of bottom trawl gear and the following criteria: (1) the target was California halibut and more than 150 lbs. of California halibut was landed or (2) the target was nearshore mix, sand sole, or other flatfish and the tow took place in less than 30 fathoms and south of 40°10' N. latitude. All IFQ bottom trawl tows that met at least one of the above requirements were analyzed using methods

for IFQ discard estimation to reflect the sampling protocol performed by observers on the boat. Tow targets are typically determined by the vessel captain. In 2017, however, no LE California halibut tows occurred.

### 100% Observed Shore-Based IFQ Sectors

Observer data from the IFQ fishery not participating in the EM EFP were stratified by sector, gear type, and management area to the finest possible level while maintaining confidentiality (Table 1). In 2017, a small amount of effort occurred in an EFP that used EM and an observer on all hauls to explore potential changes to discard handling; this data is included here as 100% observed. When sample size was adequate (10 hauls or more per strata) and data confidentiality rules could be met, we further stratified by season and depth. Records were separated into two groundfish management areas: north and south of 40°10' N. latitude. Each management area was divided into three depth strata (0-125, 126-250, >250 fathoms). These depth strata highlight the areas shoreward and seaward of Rockfish Conservation Area (RCA) closures relevant in the fishery management framework and provide consistency when evaluating discard over time, as depth-based spatial closures change. The fishery was further stratified into two seasonal strata: winter (November-April) and summer (May-October), reflecting seasonal changes in RCA boundaries, fishing effort, and target species (e.g. winter petrale sole).

On rare occasions (e.g., observer illness), tows or sets are unsampled, although an observer is present on 100% of trips. In some cases, tows or sets may have some portion of unsampled discarded catch recorded in very broad or mixed categories (Table A-2). At the stratum-level, we used ratio estimators to apportion any unsampled discard weight to specific species based on the composition of observed catch.

To obtain the estimated discard weight of a species ( $W$ ) when the entire haul or set was unsampled, the unsampled discard weight, summed within the stratum, was multiplied by the ratio of the discard weight of the species (summed across sampled hauls within a stratum) divided by the total discard weight of all species in all sampled hauls within a stratum:

$$W = \sum_p x_p \times \frac{\sum_f w_f}{\sum_f x_f}$$

where, for each stratum:

$W$  = estimated unsampled discard weight of a given species in a stratum

$p$  = unsampled haul

$x$  = total weight of discarded catch of all species

$f$  = sampled haul

$w$  = sampled discard weight of a given species

In hauls with unsampled catch categories, unsampled discard weight was recorded as non-IFQ species (NIFQ) or IFQ species. Unsampled IFQ species weight could be further categorized into IFQ flatfish (IFQFF), IFQ rockfish (IFQRF), IFQ roundfish (IFQRD), and IFQ mixed species (IFQM) (Table A-2). IFQM included all 2017 IFQ managed species (see Tables A-1 or A-2 or 78 FR 579), while NIFQ included all other fish species. Observers are instructed that IFQ hauls or sets in which they record unsampled categories cannot also contain sampled species that are within the unsampled category to avoid double counting. Rarely, observers are unable to sort discard by IFQ status, resulting in unsampled discard that contains both IFQ and non-IFQ species (referred to as ZMIS). Even less often, entire hauls, including species that would have normally been retained, are discarded at-sea either due to errors (e.g., net rips before landed) or operational considerations (e.g., deliberate release of catch from net before landing because of safety or other concerns). In these instances, the observer records a visual estimate as unsorted

catch (UNST), including both discarded and retained species. Very infrequently, haul data fail quality control measures. In these cases, observer data for the failed haul were ignored, and discards were estimated based on stratum-level observed discard rates and haul-level estimates of retained values from fish tickets.

To obtain the estimated discard weight of a species ( $W$ ) in strata that include unsampled categories, the unsampled discard weight, summed within the stratum, was multiplied by the ratio of the sampled discard weight of the species to the sampled weight of all species included in an unsampled category (NIFQ, IFQFF, IFQRF, IFQRD, IFQM, ZMIS) within a stratum. When entire hauls, including species that are typically retained, were unsampled (UNST), the same formula was applied, but included both discarded and retained weight for all species. Data was failed (FAIL) when errors occurred consistently throughout an observer's sampling of a haul or trip. In these cases, discard is estimated using the ratio of sampled discarded to retained for each species in the stratum, multiplied by the known retained weight from the fish tickets associated with the failed trip. Estimated discard weight of the species was calculated and summed across unsampled categories:

$$W = \sum_y \left( \sum_p x_{p,y} \times \frac{\sum_f w_{f,y}}{\sum_f x_{f,y}} \right)$$

where, for each stratum:

$W$  = estimated unsampled discard weight of a given species within a stratum

$y$  = unsampled catch category (either NIFQ, IFQFF, IFQRF, IFQRD, IFQM, ZMIS, UNST, or FAIL)

$p$  = unsampled catch

$x$  = catch weight

$f$  = sampled catch

$w$  = sampled discard weight of a given species

Expanded discard weights of a particular species obtained using the equations above for unsampled hauls or partially unsampled hauls (those containing both sampled and unsampled catch categories) were then added to the sampled discard weight of that species within each stratum to obtain the total species-specific discard weight per stratum (Tables 2a, 2b).

The 2017 midwater hake and rockfish fisheries which deliver to shore-based processors were observed by the WCGOP under the IFQ fishery, and discard was estimated in the same manner as described above. Prior to 2011, this fishery was conducted under an EFP. It continues to operate as a “maximum retention” fishery, where minor amounts of operational discard at-sea are permissible provided the observer accounts for the discard weight. Prior to 2015, this fishery was defined based on the species targeted by the captain and recorded in the logbook and observer notes and divided into the IFQ non-hake midwater trawl and the shoreside hake sector. With new regulations (50 CFR 660, 80 FR 239), this fishery is now defined and managed based on percentage of hake landings for each vessel per landing day, so that the fishery now consists of the shoreside midwater hake (landing  $\geq 50\%$  hake) and the shoreside midwater rockfish sectors (landing  $< 50\%$  hake).

### Electronically Monitored Shore-Based IFQ Sectors

For those IFQ vessels participating in the IFQ EM EFP fishery, discard rules and observer requirements varied by gear. EM systems use video recordings to estimate weights of certain IFQ species (see Table 2d) that are allowed to be discarded at sea. In 2015, the first year of this EFP, both the WCGOP and fishing crews worked to implement and improve procedures for sorting catch into (1) at-sea discard, (2) retained and expected to be landed for revenue,

and (3) retained but expected to be discarded shoreside. In 2017, these refined protocols provided more accurate discard estimation, as described below.

Vessels fishing using pot or bottom trawl gear followed guidelines for optimized retention and could discard only certain allowed species; on those vessels, observer coverage was targeted at a random sample of 30% of trips to result in 25 to 30% of landings. In 2017, seemingly primarily due to misunderstandings of observer coverage requirements, only 16% of landings were observed. For non-IFQ species, total at-sea discard estimates were calculated in the same manner described below for non-catch shares fisheries. A ratio estimator of observed discard rates from the EM fleet was applied to the total amount of groundfish retained by this fleet, with rates and total landings stratified by gear (pot or bottom trawl) and by area where possible while maintaining confidentiality (Table 2c). In addition, observers and fishers worked together to sort non-IFQ species that were not discarded at-sea, but were expected to be discarded shoreside (Table 2c). The only species consistently recorded by both observers as likely shoreside discard and by shoreside processors on fish tickets were longnose skate, pacific grenadier, and spiny dogfish shark. For all other species, we calculated a “shoreside discard” rate, following the procedures described above for at-sea discard, and multiplied this rate by total groundfish landings. We are confident that very little double-counting between observed estimated shoreside discard and landings on fish ticket receipts occurred, as we specifically excluded species where the possibility was likely. For at-sea IFQ species, we chose to use EM video reviewer data as the most accurate record, as it provides 100% coverage of at-sea discard for this subset of species (Table 2d). However, a small amount of unmonitored at-sea discard occurs, due to spillage or lost gear; in these cases, we expanded the estimated amount of lost catch based on the composition of known landings and at-sea discard.

The midwater sectors operate under maximized retention, so no observer coverage was required on any trips where EM systems were in place (Table 2e). Instead, the small amount of at-sea discard of IFQ species recorded by EM logbooks was provided by PSMFC and included in the report. Similar to the EM pot and bottom trawl sectors, a small amount of unmonitored at-sea discard was expanded at the haul-level, based on the composition of shoreside landings.

As with all other sectors, fleetwide landing data for the EM sector was acquired from PacFIN fish tickets. Data from observer records and from the EM systems via PSMFC enabled the identification of all fish tickets associated with EM trips.

### **Mortality Summary for Shore-Based IFQ Sectors**

We estimated coast-wide landings, discard weight from 100% observer coverage and EM data, and fishing mortality, including discard mortality rates, in the 2017 shore-based non-hake IFQ sectors (Table 3a). We applied a 50% mortality rate to discarded sablefish and lingcod weight caught by IFQ bottom trawl and LE California halibut trawl sectors, reflecting guidance from the GMT to use rates from management under the pre-IFQ LE groundfish bottom trawl sector (before 2011). We also applied a 20% mortality rate to discarded sablefish caught by IFQ longline and pot gear, the rate suggest by GMT based on non-nearshore groundfish fixed gear sectors. We applied a 7% mortality rate to discarded lingcod caught by IFQ hook-and-line gear, previously used in nearshore groundfish fixed gear sectors. We also applied SSC-recommended discard mortality rate assumptions (previously made for stock assessment purposes) for longnose skate (50% for both bottom trawl and fixed gear) and spiny dogfish (50% for hook-and-line) (PFMC 2012), as well as for big skate (50% for bottom trawl) (PFMC 2015a, 2015b).

The total estimated weight, comprised of the sampled and expanded discard weight and the landed weight, is reported by species for the shoreside midwater hake sector (Table 3a) and for the shoreside midwater rockfish sector (Table 3b). No discard mortality rates are applied in midwater trawl sectors.

## At-Sea Hake Co-op Sectors

The midwater trawl fishery for hake is comprised of three at-sea processing fleets: CPs, MSCVs, and a tribal catcher vessel fleet delivering to motherships. The A-SHOP produces estimates of total catch (discarded and retained) in the at-sea hake fishery. Observers sample unsorted catch and provide a visual estimate of the proportion retained, at the species level. Discarded catch weight is calculated on a haul basis for the total weight of all species. The discard weight estimate, along with the proportion retained, form the basis for the two at-sea hake sectors summarized in Table 3b. In 2017, the tribal fleet did not make any at-sea landings; shore-based tribal landings are presented in Table 15. We estimated coast-wide landings, sampled discard weight, estimated discard weight, and estimated fishing mortality in all 2017 hake IFQ/Co-op Program sectors (Table 3b).

## California Halibut Bottom Trawl Fishery

Fleet-wide discard estimates in the California halibut bottom trawl fishery were derived from WCGOP and fish ticket data. All California halibut vessels are permitted by the state of California, but are considered OA unless they also have a federal LE groundfish permit. In 2017, no fishing effort occurred in the LE California halibut fishery. The WCGOP randomly samples the OA California halibut fishery following non-catch shares sampling priorities, protocols, and selection design.

Discard ratios for the OA California halibut fishery were calculated by dividing the observed discard weight of each species or complex by the observed retained weight of California halibut. The fleet-wide landed weight of California halibut was then used as a multiplier to expand observed discard ratios to the fleet-wide level (Table 4). Fleet-wide landings were compiled from OA trawl fish tickets (see Figure 1) for those vessels that had a state-issued California halibut bottom trawl permit but no federal bottom trawl permit.

The discard estimate for each species was computed based on the following equation:

$$D = \frac{\sum_t d_t}{\sum_t r_t} \times F$$

where:

$D$ : discard estimate for a given species

$t$ : observed tows

$d$ : observed discard weight for a given species

$r$ : observed retained weight of California halibut

$F$ : weight of retained California halibut recorded on fish tickets for the fleet (expansion factor)

We estimated fishing mortalities of groundfish species caught in the OA California halibut trawl fishery (Table 4a). A 50% mortality rate was applied for discarded lingcod and sablefish, which are assumptions made by the GMT and carried over from management under the pre-IFQ groundfish bottom trawl sector. We also applied an SSC-recommended discard mortality rate assumption (previously made for stock assessment purposes) of 50% for longnose skate (PFMC 2012) and a 50% mortality rate to big skate discard (PFMC 2015a, 2015b).

## CA Sea Cucumber Trawl Fishery

For the first time in 2017, the sea cucumber trawl fishery was observed by WCGOP as a pilot study, and fleet-wide discard estimates were derived from WCGOP and fish ticket data (Figure 1). Prior to 2017, landings in this fishery were included in the “Incidental Fisheries,” and no estimates of discards were calculated. Effort in this fishery

occurs only in California, uses shrimp trawl and bottom trawl, and lands more sea cucumber than other species. Discard estimates for each species was computed based on the same equation as described above for the OA California halibut fishery, but utilizing sea cucumber as the retained weight for both discard rates and expansion factors. No mortality rates were applied. We estimated landings, discard, and total mortality in the 2017 sea cucumber trawl fishery (Table 4b).

### **Pink Shrimp Trawl Fishery**

Fleet-wide discard estimates for the pink shrimp trawl fishery were derived from WCGOP and fish ticket data (Figure 1). The discard estimate for each species in each state was computed based on the same equation as described above for the OA California halibut fishery, but utilizing pink shrimp as the retained weight for both discard rates and expansion factors. We estimated landings, discard, and total mortality in the 2017 individual state pink shrimp trawl fisheries (Table 5a).

Prior to 2011, shrimp fish tickets in the area north of 40°10' N. latitude were compiled for a single discard expansion factor, but shrimp fish tickets south of 40°10' N. latitude landings were summarized as part of the remaining incidental fisheries. Observer data from all state pink shrimp fleets in the north were combined to calculate discard rates. In 2010, WCGOP coverage of the Washington pink shrimp fleet began, and coverage of all state fisheries from 2011 to the present were sufficient to further stratify the analysis by state.

### **CA Ridgeback Prawn Trawl Fishery**

The WCGOP observed the CA prawn fishery from 2002 to 2005, covering vessels targeting coonstripe, ridgeback, and spotted prawn, but this data has not been used in discard estimations. In 2017, the WCGOP observed the CA ridgeback prawn portion of the prawn fishery as a pilot study, and fleet-wide discard estimates were derived from WCGOP and fish ticket data (Figure 1). Prior to 2017, landings in this fishery were included in the “Incidental Fisheries,” and no estimates of discards were calculated. Effort in this fishery occurs only in California, uses shrimp trawl and bottom trawl gears, and lands more ridgeback prawn than other species. Discard estimates for each species were computed based on the same equation as described above for the OA California halibut fishery, but utilizing ridgeback prawn as the retained weight for both discard rates and expansion factors. No mortality rates were applied. We estimated landings, discard, and total mortality in the 2017 ridgeback prawn trawl fishery (Table 5b).

### **Non-Nearshore Fixed Gear Fishery**

Fleet-wide discard estimates for the LE and OA non-nearshore fixed gear sector of the groundfish fishery were derived from WCGOP and fish ticket data. Fish tickets for fixed gear that did not have recorded sablefish or nearshore species were included in the non-nearshore fixed gear sector only if groundfish landings were greater than non-groundfish landings based on a unique vessel and landing date (Figure 1). Fixed gear fish tickets where non-groundfish landings were greater than groundfish landings and sablefish or nearshore species were not recorded were summarized as incidental landings (Table 14). Fixed gear fish tickets with non-groundfish landings greater than groundfish landings but also containing sablefish were classified as non-nearshore fixed gear; those with nearshore species landings on a nearshore permit were classified as nearshore fixed gear sector. Fish tickets associated with the Pacific halibut directed commercial fishery were isolated and removed from our analyses based on landed catch of Pacific halibut recorded on the fish ticket on the day of the opening or within two subsequent days.

Fish tickets were partitioned into three commercial fixed gear subsectors: LE sablefish endorsed primary season, LE non-sablefish endorsed, and OA fixed gear groundfish. Vessels landing catch without a federal groundfish permit were classified as the OA fixed gear groundfish subsector. Those vessels landing catch with a federal groundfish permit were further separated based on whether the vessel's federal groundfish permit(s) had a sablefish



endorsement with tier quota for the primary season or whether it was not endorsed (also referred to as '0' tier permits). Fish tickets for all LE vessels with tier sablefish endorsements operating during the sablefish primary season (April – October) and within their allotted tier quota were placed in the LE sablefish endorsed primary subsector. If LE sablefish-endorsed vessels fished outside of the primary season (November-March) or made trips within the season after they had reached their cumulative tier quota, the fish tickets were placed in the LE non-sablefish endorsed subsector. Fish tickets from non-sablefish endorsed LE vessels were also placed in this subsector.

Data used in these analyses were collected by the WCGOP from the following fixed gear subsectors in order of priority: LE sablefish endorsed primary season fixed gear, LE '0' tier (non-endorsed), and OA fixed gear (non-nearshore). LE sablefish endorsed vessels that were fishing outside of the primary season or that had reached their cumulative tier quota in the primary season were not observed. However, observed LE '0' tier discard rates were assumed to be the most comparable discard rates and were used to expand these landings.

Observer data were stratified by subsector, gear type, and area (where applicable) (Tables 6-8). Area strata (north and south of 36° N. latitude) are based on PFMC area management for sablefish trip limits. Gear type was defined as longline gear or pot/trap gear. Explicit depth stratification of fixed gear fishing effort is not possible, because there are no fleet-wide estimates of fishing depths. If landings were made by a fixed gear subsector for which there were no or very few WCGOP observations, the most appropriate observed discard ratios were selected and applied to these landings based on similarities in the fishery management structure, fishing and discard behavior, and the gear fished. For example, observed discard rates from the OA fixed gear pot sector was used to estimate the total discard associated with the small amount of groundfish landed by the pot gear portion of the LE non-sablefish endorsed subsector, which is unobserved.

We summarized the number of observed vessels, trips, and sets, along with fleetwide sablefish and FMP-groundfish landings (Tables 6-8). Retained groundfish was used as the denominator rather than sablefish weight alone because some subsectors, primarily fixed gear fisheries south of 36° N. latitude have, a wider range of target species. A broader denominator was therefore necessary to effectively capture fishing effort in these calculations.

We calculated total coast-wide landings, discard, and fishing mortality for the LE and OA non-nearshore fixed gear sectors (Table 9a). A 20% mortality rate is applied for discarded sablefish and a 7% rate for line-caught discarded lingcod, based on guidance from the GMT. We also applied SSC-recommended discard mortality rates (previously made for stock assessment purposes) for longnose skate (50%) and spiny dogfish (50%) (PFMC 2012).

## **Pacific Halibut Derby Fishery**

For the first time in 2017, the WCGOP observed the Pacific halibut derby fishery as a pilot study, and fleet-wide discard estimates were derived from WCGOP and fish ticket data (Figure 1). As described above in the non-nearshore fixed gear sector, this fishery was defined based on using fixed gear and landing Pacific halibut within two days of the halibut derby openings. Prior to 2017, landings in this fishery were included in the "Incidental Fisheries," and no estimates of discards were calculated. Effort in this fishery occurs primarily in Washington and Oregon and uses only hook-and-line gear. Discard estimates for each species were computed based on the same equation as described above for the OA California halibut fishery, but utilizing Pacific halibut as the retained weight for both discard rates and expansion factors. We estimated landings, discard, and total mortality in the 2017 Pacific halibut derby fishery (Table 9b). Because the gear and effort in this fishery is similar to the non-nearshore and catch shares hook-and-line fisheries, the same mortality rates were applied to discarded lingcod (7%), longnose skate (50%), sablefish (20%), and spiny dogfish (50%).

## Nearshore Fixed Gear Fishery

Fleet-wide discard estimates for the commercial nearshore fixed gear sector of the groundfish fishery were derived from WCGOP observer data, fish ticket landings (Figure 1), and mortality rates provided by the GMT (Table A-4).

The WCGOP selects commercial nearshore vessels in California and Oregon for observer coverage based on state-issued nearshore permits or licenses; no nearshore fishery exists in Washington. Although California and Oregon nearshore fisheries are sampled separately for observer coverage, fleet-wide discard estimates are provided for the areas north and south of the groundfish management line at 40°10' N. latitude, in accordance with federal groundfish management specifications.

For species without swim bladders, we applied a discard mortality rate of 7% for all FMP species (Albin and Karpov 1996). In June 2017, the GMT provided revised depth-specific discard survival assumptions for some nearshore species (Table A-4). This update separated the >20 fathoms depth bin into 20-30 and > 30 fathoms, allowing for more accurate accounting of discard mortality by depth, and provided distinct rates north and south of 40°10' N. latitude that reflect the differing depth distribution of observed fishing effort and align with recreational mortality rates using similar gear (PFMC 2017). We first generated estimates of the depth distribution of landings (0-10, 11-20, 20-30, and >30 fathoms) based on the observed percentage of catch for each species or complex from 2003-2017 (Table 10). Using data from all previously observed years ensures that data is comparable across years and that proportions are available for all species landed in a given year. Fleet landings of each nearshore species or complex in 2017 were then distributed among depth intervals using the percentages computed in the previous step. Finally, the total distributed landed weight of all nearshore groundfish species within each depth stratum was used to expand observed discard to the fleet-wide level.

Prior to the calculation of discard ratios in this sector, WCGOP observer data were stratified by area and depth (Table 11). Discard ratios were calculated by dividing the stratum discard weight of each species or complex by the retained weight of nearshore species. Observed discard ratios were multiplied by the allocated landed weight of all nearshore groundfish species within each depth stratum and then by the depth-specific discard mortality rates. Nearshore fishermen focus much of their effort in shallow waters, so the estimated amount of catch in deeper depth bins is most often confidential. Because we are unable to display the observed discard ratios used to estimate mortality, we provide the CVs at the finest aggregated, non-confidential strata possible north and south of 40°10' N. latitude (Table 11). We also report the total estimated gross discard and discard mortality, calculated at the confidential-level depth strata (Tables 12a, 12b).

We summarize the estimated total fishing mortality in observed non-IFQ groundfish fisheries by sector (Table 13).

## Other Commercial Data Summaries

Landings of groundfish species from other non-groundfish fisheries operating under federal OA landing limits, which are mostly state-managed, and a small number of EFPs outside of the EM program are summarized by gear group (Table 14). Other than observed non-EM EFP trips, catch summaries of incidental fisheries are based exclusively on fish ticket data and therefore do not include any estimates of discards at-sea.

Landings of groundfish species from the Washington tribal shore-based fisheries are included in Table 15. The Washington tribal data are based exclusively on fish ticket data, because tribal directed groundfish fisheries employ full retention requirements. In addition, both the Makah bottom trawl and midwater, targeting yellowtail, trawl sectors are monitored at a target tribal observation rate of 15%. In tribal management, discard mortality of fixed gear sablefish is accounted for by the PFMC reducing the tribal allocation. For more information on discard and

retention in tribal sablefish fisheries and Makah trawl observations, see Appendix B of the 2011-2012 groundfish harvest specifications (PFMC and NMFS 2012).

Groundfish species catch from research activities and each state's recreational fisheries, combined across all gear types, is also summarized in Table 15.

Bycatch estimation and summaries for managed and protected fish species observed by the WCGOP and A-SHOP are available in separate reports: Pacific halibut (Jannot et al. 2018), salmon species (Somers et al. 2015, Somers et al. 2018b), green sturgeon (Lee et al. 2017), and Pacific eulachon (Gustafson et al. 2017). Updates to all of these reports will be available in spring of 2019. Mortality estimations for all non-protected fish species from 2002-2017 are available in the Groundfish Expanded Mortality Multi-year (GEMM) product, which will be published on the FRAM Data Warehouse<sup>4</sup>.

## Cumulative Mortality Estimation Methods

We calculated the cumulative mortality for each species in a sector as the sum of the total discard mortality (with mortality rate applied) and retained weight. To calculate the cumulative mortality across all sectors, we summed the estimated discard mortality and retained weight from all observed sectors, the retained weight from unobserved incidental fisheries (as described above), and the mortality estimates from research and recreational catch (Table 15).

## Results

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Fishing mortality estimates for all groundfish catch combined were higher in 2017 relative to 2016 in the at-sea hake CP and MSCV, catch shares pot and bottom trawl, and OA fixed gear sectors (Table 15, Somers et al. 2016).

Estimated fishing mortality of all groundfish species and complexes were lower than 2016 levels in the catch shares hook-and-line, sablefish primary, nearshore, and pink shrimp sectors.

The percentage of all shoreside catch shares sectors, except for midwater rockfish, using EM systems increased from 2016 to 2017 (Tables 2a-2e, Somers et al. 2018a). In both 2016 and 2017, the pot gear portion of the fleet landed ~860 mt of groundfish across both EM and observer monitored trips, with a slight increase in the percentage of landings using EM from 55% in 2016 to 58% in 2017. The hook-and-line gear portion of the fleet has not adopted EM, and landings decreased by ~80 mt from 2016 to 2017. Landings by the catch shares bottom trawl sector in 2017 were ~700 mt greater than those in 2016, and approximately 12% of the bottom trawl sector used EM, an increase of about 2% over 2016. Landings by the midwater rockfish fleet increased more than five times to almost 6,000 mt of groundfish in 2017, reflecting the recent re-development of the midwater rockfish fleet as the primary targets, widow and yellowtail rockfish, have rebuilt and quotas have subsequently increased. The portion of the midwater rockfish fleet using EM simultaneously decreased from about two-thirds to one-fourth, potentially related to the recent increase in quota. In 2017, the shoreside midwater hake fleet continued to increase to more than twice of the landings in 2015: almost 150,000 mt. The proportion of those landings covered by EM increased slightly to 92% of the fleet. Landings by the at-sea hake fishery also increased from 2016 to 2017, by ~30,000 mt and ~1,600 mt in the CP and MSCV sectors, respectively; in both portions of the fleet, less than 1% of catch was unsampled.

Two elements which affect WCGOP fleet-wide discard estimates are the discard ratio and the expansion factor used to generate the fleet-wide estimates. Changes in expansion factors are tracked by reviewing the fleet-wide landing trends in each observed fishery. In state fisheries which are observed for incidental groundfish interactions, total 2017 landings in the OA California halibut trawl fishery were similar to those in 2016, with only 6.8 more mt of

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<sup>4</sup> <https://www.nwfsc.noaa.gov/data>

California halibut caught (Table 4a, Somers et al. 2018a). Only ~14 mt of sea cucumbers were landed in 2017, which was less than half of 2016 landings and a historic low since 2002 (Table 4b, Somers et al. 2018b). Landings in the pink shrimp fishery decreased in Washington by ~3,000 mt and in Oregon by ~5,600 mt and increased in California by ~100 mt from 2016 to 2017 (Table 5a, Somers et al. 2018a). Ridgeback prawn landings in 2017 were 40 mt lower than those in 2016 but less than half of the historic high seen in 2015 (Table 5b, Somers et al. 2018a).

Groundfish landings by the longline portion of the LE sablefish primary fishery increased from 2016 to 2017 by ~50 mt, while the pot gear portion was comparable across years (Table 6, Somers et al. 2018a). Landings by both pot and line gears in the LE, non-endorsed portion of the non-nearshore fixed gear fleet were similar in 2016 and 2017 (Table 7, Somers et al. 2018a), while landings by the OA longline gear increased by ~60 mt and the pot gear remained similar (Tables 8a, 8b, Somers et al. 2018a). Pacific halibut derby landings were 6 mt greater than in 2016, but the increase made 2017 landings the highest since 2002 (Table 9b, Somers et al. 2018a). Nearshore fixed gear landings decreased by 17.5 mt from 2016 to 2017 coastwide; nearshore landings in Oregon increased by about 20 mt, close to the 2002-2017 mean value, and in California decreased by about 40 mt, following a near-historic high in 2015 (Table 11, Somers et al. 2018a).

Fishing mortality estimates are evaluated in terms of 2017 ACL, ABC, and OFL harvest specifications from federal groundfish regulations (50 CFR 660 Subpart C, 82 FR 31499). Only two species remain PFMC-defined as rebuilding: cowcod rockfish south of 40°10' N. latitude and yelloweye rockfish. The ACL percentages increased for both of these species; cowcod increased from 13 to 17%, while yelloweye rockfish showed a much greater increase from 50 to 90% (Figure 2). In both cases, the greatest contribution to mortality came from recreational fishing (Figure 4). The next largest contributors to cowcod mortality were catch shares bottom trawl and research effort, while yelloweye's second greatest contributor was non-catch shares fixed gear (Figure 4).

Overall, the achievements of ACLs for the managed groundfish species and complexes in 2017 were similar to those in 2016, although a greater number of species exceeded 90% of their ACLs (Figure 3). Petrale sole achieved 91% of its ACL harvest goal in 2016 and 94% in 2017, with nearly all mortality coming from the catch shares bottom trawl sector (Figure 4). Attainment of the ACL for sablefish, north of 36° N. latitude increased from 92% in 2016 to 102% in 2017, with the greatest contribution from non-catch share fixed gear, followed by catch shares bottom trawl and then catch shares fixed gear and tribal effort (Figure 4). The management groupings for black rockfish were changed to state areas in 2017, and black rockfish in Oregon achieved 103% of its ACL goal, three-quarters of which came from the recreational sector (Figure 4). 45 and 78% of the black rockfish ACLs in California and Washington, respectively, were achieved. Finally, achievement of ACL for cabezon in Oregon increased greatly from 59% in 2016 to 108% in 2017; most of this mortality was even split between the recreational and the non-nearshore fixed gear sectors (Figure 4). Twenty-nine of the groundfish species or complexes (71%) had fishing mortality estimates which were less than 50% of 2017 ACL harvest goals (Table 16).

Of the 45 management groupings that were consistent and so could be compared across 2016 and 2017, 35 showed greater catch in 2017. Shortbelly rockfish showed the greatest relative increase, with 2017 mortality levels almost ten times those in 2016, which was primarily due to increased catch in the at-sea and shoreside-processed midwater hake fisheries. Widow rockfish (~6x, ~5300 mt), canary rockfish (~5x, ~320 mt), and yellowtail rockfish (~2x, ~1530 mt) also increased from 2016 to 2017, reflecting the increase in effort in the midwater rockfish fishery. Pacific hake increased the greatest from 2016 in total weight by almost 93,000 mt; both the CP and MSCV portions of the at-sea hake fleet showed the greatest landings since before 2002.

Of the 10 groupings that showed lower catch in 2017, Pacific cod decreased the most proportionally and by weight, with 2017 mortality ~27% of 2016 levels, which equates to a decrease of ~425 mt. Spiny dogfish also decreased to

~61% of 2016 levels, representing a decrease of more than 300 mt. Mortality of sablefish south of 36° N. latitude, English sole, and cabezon in California in 2017 were all ~70% of 2016 levels or around 130 to 140 mt decrease for each grouping.

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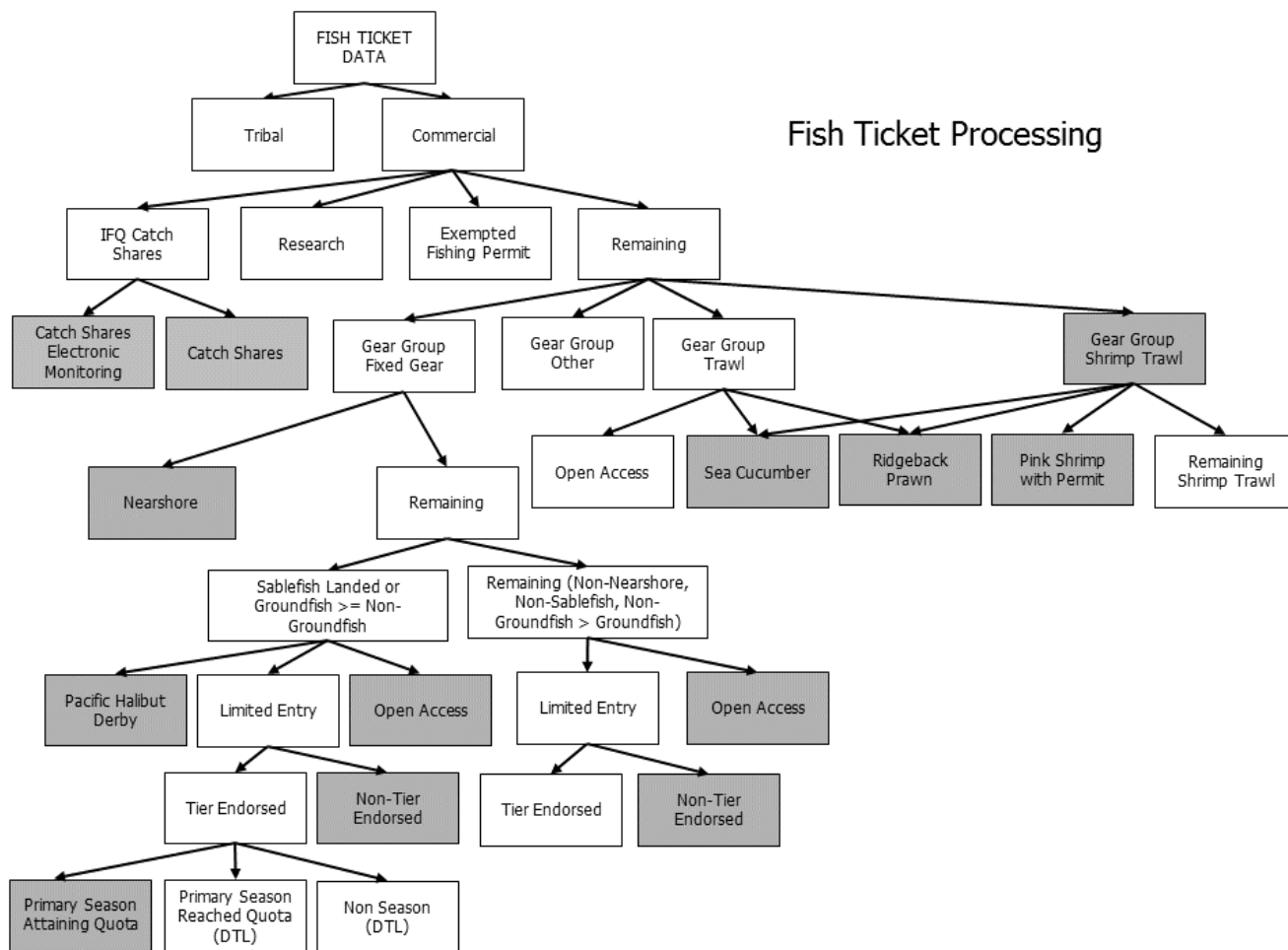
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## Figures

**Figure 1. PacFIN Fish Ticket Data Processing.**

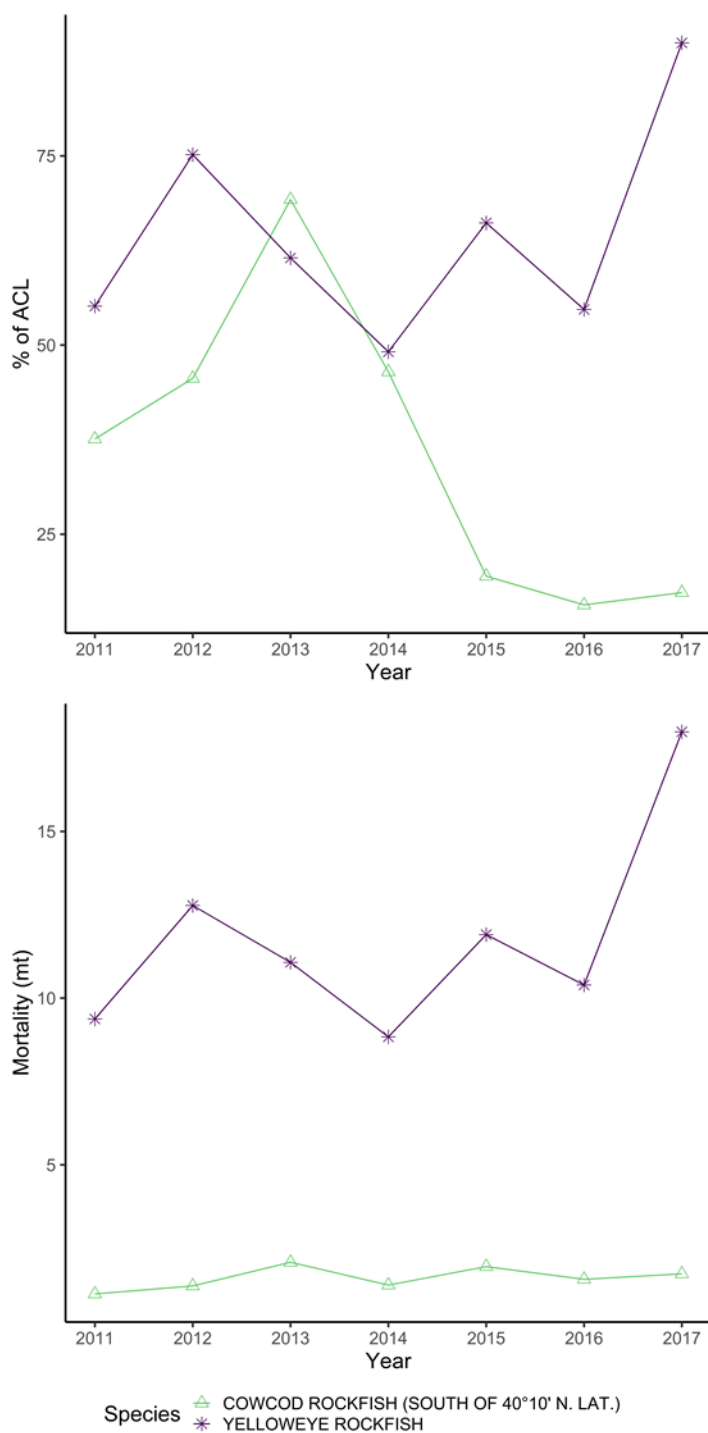
Fish ticket data processing for division into groundfish fishery sectors after retrieval of a full calendar year data set from the PacFIN database, queried 05-03-2018. Grey highlight indicates sectors for which federal observer data are available.





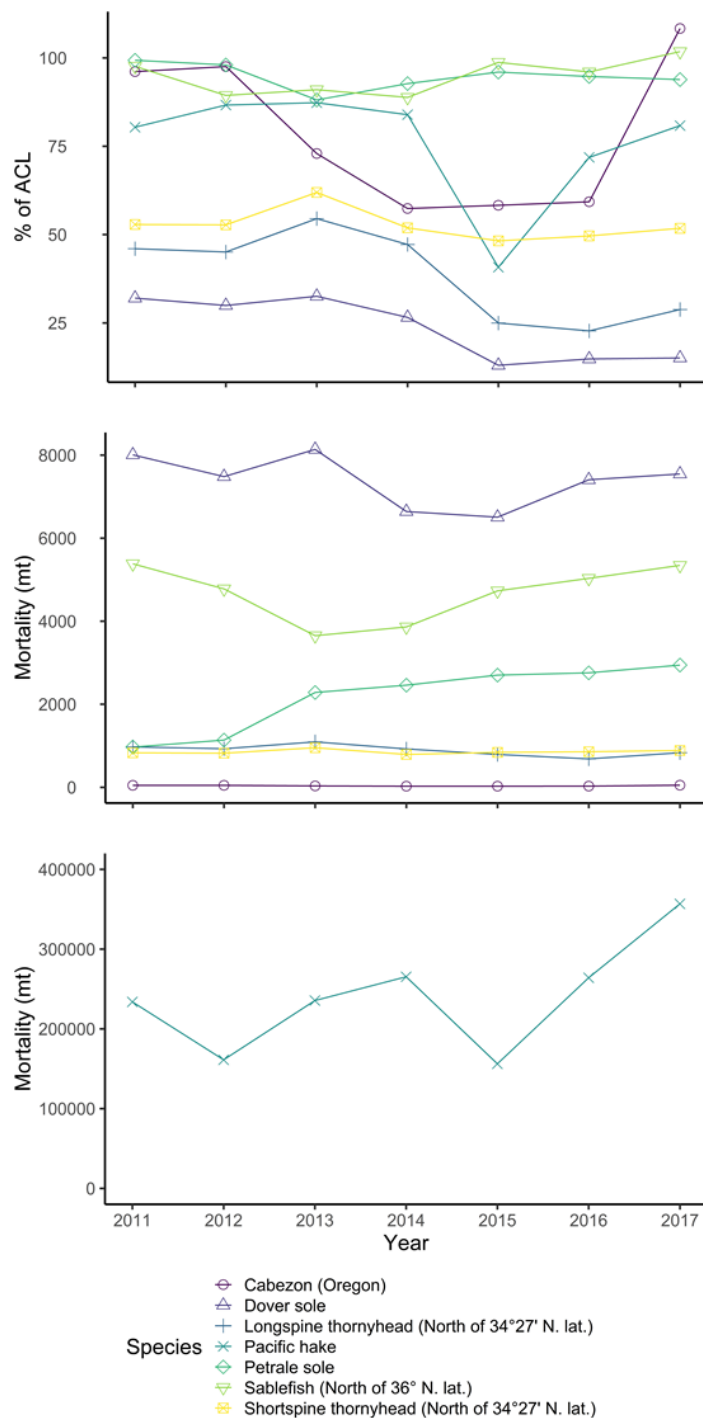
**Figure 2. Mortality and ACL percentages 2011-2017 for rebuilding species.**

Estimated mortality and percentage of ACL for the two PFMC-defined rebuilding groundfish species.



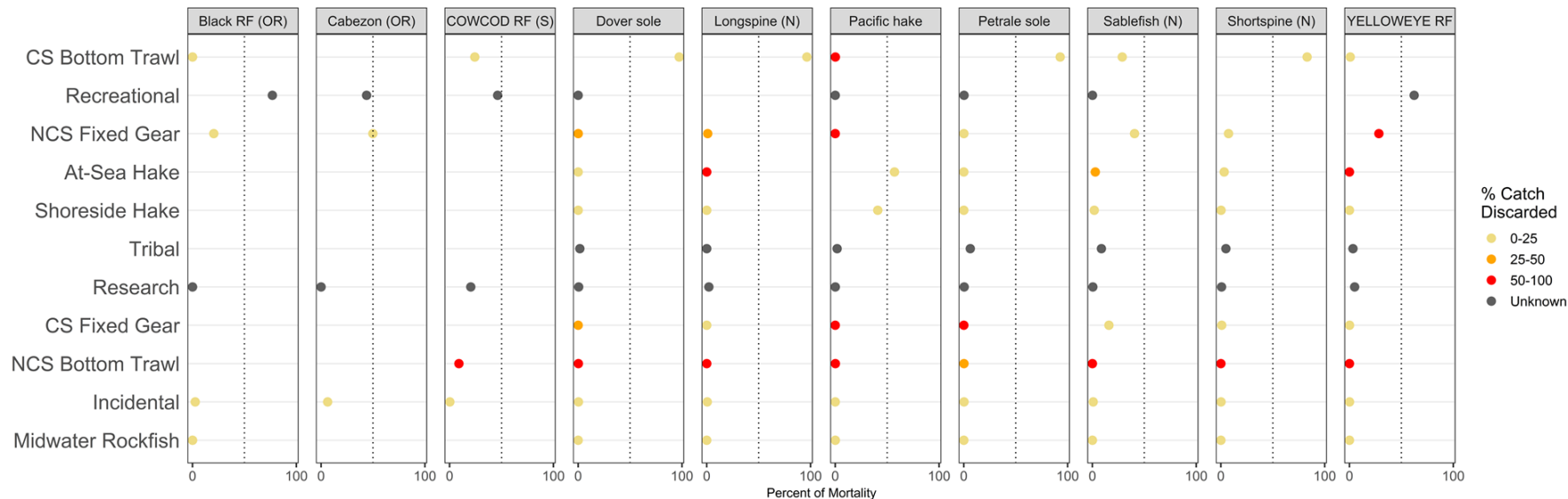
**Figure 3. Mortality and ACL percentages 2011-2017 for highly targeted and highly attained species.**

Estimated mortality and percentage of ACL for five of the most targeted groundfish species (Pacific hake, dover sole, sablefish in the north, and shortspine and longspine thornyheads in the north) and the two other highly attained species (cabezon in Oregon, and petrale sole). Black rockfish in Oregon was also highly-attained, but ACL's at the state-level were only defined in 2017 so cannot be compared across years. Pacific hake mortality is shown in a separate panel due to the greater magnitude.



**Figure 4. Mortality contributions by sector for a subset of groundfish species.**

Percentage of mortality contributed by each sector to 2017 mortality for: the two rebuilding species (cowcod and yelloweye rockfish, capitalized), five of the most targeted groundfish species (Pacific hake, dover sole, sablefish in the north, and shortspine and longspine thornyheads in the north), and the three other highly attained species (black rockfish in Oregon, cabezon in Oregon, and petrale sole). Sectors with no dot represent zero contribution; dotted line specifies 50% of mortality. Sectors are ordered by mean percent contribution to mortality across all species displayed, with greatest contributors at the top of the panels. NCS Fixed Gear includes all non-nearshore and nearshore fixed gear; NCS Bottom Trawl includes California halibut, pink shrimp, ridgeback prawn, and sea cucumber trawl.



## Tables

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Note: In all tables, -- was used when there is no actual numeric value (i.e. the species was neither caught nor discarded). Values appear as 0 when a value exists but is smaller than the decimal places allotted. All rebuilding species are capitalized.

**Table 1. IFQ Fishery Data Stratification.**

Number of vessels, trips, and hauls from WCGOP observer data for the non-EM IFQ fishery by gear, latitudinal management area, season and depth. A small amount of effort occurred in an EFP that used EM and an observer on all hauls to explore potential changes to discard handling; this data is included here as 100% observed. Data are combined as needed to ensure confidentiality requirements and a reasonable number of observations. Winter season is November-April, and summer season is May-October. Note that "unsampled hauls" are only those with unsampled categories of "All discarded species", "All species", or "Failed data".

							No. of hauls with unsampled categories								
			Depth (fm)	No. of vessels	No. of trips	No. of sampled hauls								No. unsampled hauls	% of hauls sampled
							IFQ flatfish	IFQ rockfish	IFQ roundfish	IFQ mixed	Non-IFQ species	All discarded species	All species (incl. those typically retained)		
Trawl - Bottom	North of 40°10' N	Winter	0-125	17	44	179	--	--	--	--	2	--	--	--	100.0%
			126-250	40	341	1278	--	--	--	2	27	3	--	3	99.8%
			> 250	42	314	1190	--	--	--	--	38	--	--	--	100.0%
		Summer	0-125	28	281	2203	22	--	--	1	65	1	2	3	99.9%
			126-250	30	140	555	--	--	--	--	11	--	1	1	99.8%
			> 250	29	129	498	--	--	--	--	10	--	--	--	100.0%
	South of 40°10' N	Winter	0-250	5	23	80	--	--	--	--	--	--	--	--	100.0%
			> 250	4	16	74	--	--	--	--	--	--	--	--	100.0%
		Summer	0-250	5	22	91	--	--	--	--	--	1	--	1	98.9%
			> 250	4	25	109	--	--	--	--	2	--	--	--	100.0%
Trawl - Midwater Hake	North of 40°10' N	Summer	0-125	4	112	178	--	--	--	--	--	--	--	--	100.0%
			126-250	3	36	58	--	--	--	--	--	--	--	--	100.0%
Trawl - Midwater Rockfish	North of 40°10' N	Annual	All depths	11	131	267	--	--	--	--	--	--	--	--	100.0%
Hook-and-Line	Coastwide	Summer	All depths	4	13	145	--	--	--	--	--	--	--	4	97.3%
Pot	North of 40°10' N	Annual	0-250	4	31	270	--	--	--	--	--	--	--	--	100.0%
			>250	4	32	214	--	--	--	--	--	--	--	--	100.0%
	South of 40°10' N	Annual	All depths	3	7	87	--	--	--	--	--	--	--	--	100.0%

**Table 2a. IFQ Discard Ratios, Bottom Trawl, North of 40°10' N.**

Values used to calculate the expanded weight of groundfish species from each WCGOP unsampled catch category in the observed IFQ fishery using bottom trawl gear north of 40°10' N. latitude. A small amount of effort occurred in an EFP that used EM and an observer on all hauls to explore potential changes to discard handling; this data is included here as 100% observed bottom trawl effort. Expansion factors for each season and depth strata are shown in the top row. Discard ratios for each species are presented by season and depth strata in the rest of the table. Winter season is November-April, and summer season is May-October. Only strata with unsampled discard weight are shown. Unsampled catch weight is assigned to the following categories: IFQ flatfish species (IFQFF), IFQ rockfish species (IFQRF), IFQ roundfish species (IFQRD), IFQ mixed species (IFQM), non-IFQ species (NIFQ), all discarded species (IFQ & non-IFQ), all species (IFQ & non-IFQ), and all failed data. See Table A-2 for a list of species included in each unsampled category.

		Bottom Trawl (North of 40°10' N Lat.)												
		IFQFF	IFQM		NIFQ					All Discarded Species		All Species		
Season	Depth (fm)	Summer	Winter	Summer	Winter			Summer			Winter	Summer	Summer	
		0-125	126-250	0-125	0-125	126-250	>250	0-125	126-250	>250	126-250	0-125	0-125	126-250
Expansion Factor (mt)		7.9039	0.1361	0.5897	0.5176	2.1682	1.7940	4.6256	0.8437	0.5874	1.1045	0.3175	3.1752	0.4536
Groundfish species														
	Arrowtooth flounder	0.3467	0.3689	0.2118	--	--	--	--	--	--	0.2246	0.1095	0.0560	0.1140
	Big skate	--	--	--	0.0639	0.0002	0.0000	0.0681	0.0002	0.0006	0.0001	0.0329	0.0435	0.0063
	Black rockfish (Oregon)	--	--	--	--	--	--	--	--	--	--	--	0.0000	--
	Black rockfish (Washington)	--	--	--	--	--	--	--	--	--	--	--	0.0000	--
	Canary rockfish	--	--	0.0000	--	--	--	--	--	--	--	0.0000	0.0285	0.0001
	Darkblotched rockfish	--	0.0010	0.0047	--	--	--	--	--	--	0.0006	0.0024	0.0013	0.0242
	Dover sole	0.0699	0.0026	0.0427	--	--	--	--	--	--	0.0016	0.0221	0.1923	0.3849
Ecosystem component species														
	Aleutian Skate	--	--	--	--	0.0013	0.0014	0.0001	0.0027	0.0012	0.0005	0.0001	0.0000	0.0001
	Black Skate	--	--	--	--	0.0013	0.0249	--	0.0027	0.0516	0.0005	--	--	0.0001
	California Grenadier	--	--	--	--	0.0000	0.0000	--	0.0000	0.0000	0.0000	--	--	0.0000
	California Skate	--	--	--	--	--	--	0.0002	--	--	--	0.0001	0.0000	--
	Deepsea Skate	--	--	--	--	--	0.0005	--	--	0.0000	--	--	--	--
	Giant Grenadier	--	--	--	--	0.0034	0.1161	--	0.0016	0.1428	0.0013	--	--	0.0001
	Grenadier Unid	--	--	--	--	0.0000	0.0016	--	--	0.0358	0.0000	--	0.0000	0.0002
	Pacific Flatnose	--	--	--	--	0.0000	0.0013	--	0.0000	0.0015	0.0000	--	--	0.0000
	Pacific Grenadier	--	--	--	--	0.0003	0.0248	--	0.0004	0.1094	0.0001	--	--	0.0000
	Popeye Grenadier	--	--	--	--	--	--	--	--	0.0000	--	--	--	--
	Sandpaper Skate	--	--	--	0.0223	0.1225	0.0920	0.0224	0.1190	0.0296	0.0479	0.0108	0.0022	0.0042
	Smooth Grenadier	--	--	--	--	--	0.0000	--	--	--	--	--	--	--
	Soupin Shark	--	--	--	--	--	--	0.0004	--	--	--	0.0002	0.0000	--
	Spotted Ratfish	--	--	--	0.1377	0.0850	0.0211	0.1056	0.0759	0.0073	0.0333	0.0510	0.0106	0.0027
	English sole	0.0684	0.0004	0.0418	--	--	--	--	--	--	0.0003	0.0216	0.0309	0.0055
	Lingcod (North of 40°10' N. lat.)	--	0.0023	0.0477	--	--	--	--	--	--	0.0014	0.0247	0.0711	0.0130
	Longnose skate	--	--	--	0.1177	0.1162	0.0787	0.0860	0.1517	0.0370	0.0454	0.0416	0.0405	0.0653
	Longspine thornyhead (North of 34°27' N. lat.)	--	0.0002	0.0000	--	--	--	--	--	--	0.0001	0.0000	0.0010	0.0069
Minor nearshore rockfish (North of 40°10' N. lat.)														
	Blue/Deacon Rockfish	--	--	--	--	--	--	--	--	--	--	--	0.0000	--
	Copper Rockfish	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000
	Nearshore Rockfish Unid	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000
	Quillback Rockfish	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000

Table 2a (continued).

IFQ - Bottom Trawl (North of 40°10' N Lat.)													
	IFQFF	IFQM		NIFQ						All Discarded Species		All Species	
	Summer	Winter	Summer	Winter			Summer			Winter	Summer	Summer	
	0-125	126-250	0-125	0-125	126-250	>250	0-125	126-250	>250	126-250	0-125	0-125	126-250
Season	7.9039	0.1361	0.5897	0.5176	2.1682	1.7940	4.6256	0.8437	0.5874	1.1045	0.3175	3.1752	0.4536
Depth (fm)													
Expansion Factor (mt)													
Minor shelf rockfish (North of 40°10' N. lat.)													
Bocaccio Rockfish	--	--	0.0003	--	--	--	--	--	--	--	0.0002	0.0052	0.0002
Chilipepper Rockfish	--	0.0001	0.0086	--	--	--	--	--	--	0.0001	0.0044	0.0048	0.0006
Cowcod Rockfish	--	--	--	--	--	--	--	--	--	--	--	0.0000	--
Greenblotched Rockfish	--	--	0.0000	--	--	--	--	--	--	--	0.0000	0.0000	--
Greenspotted Rockfish	--	--	0.0001	--	--	--	--	--	--	--	0.0000	0.0000	0.0000
Greenstriped Rockfish	--	0.0001	0.0491	--	--	--	--	--	--	0.0000	0.0254	0.0093	0.0004
Halfbanded Rockfish	--	--	0.0000	--	--	--	--	--	--	--	0.0000	0.0000	--
Harlequin Rockfish	--	--	0.0000	--	--	--	--	--	--	--	0.0000	0.0000	--
Pygmy Rockfish	--	--	0.0000	--	--	--	--	--	--	--	0.0000	0.0000	--
Redstripe Rockfish	--	0.0000	0.0000	--	--	--	--	--	--	0.0000	0.0000	0.0001	0.0001
Rosethorn Rockfish	--	0.0007	0.0003	--	--	--	--	--	--	0.0004	0.0001	0.0002	0.0003
Rosy Rockfish	--	0.0000	0.0000	--	--	--	--	--	--	0.0000	0.0000	0.0000	--
Shelf Rockfish Unid	--	--	9.34E-05	--	--	--	--	--	--	--	0.0000	0.0119	0.0002
Silvergray Rockfish	--	--	--	--	--	--	--	--	--	--	--	0.0001	0.0001
Starry Rockfish	--	--	--	--	--	--	--	--	--	--	--	0.0000	--
Stripetail Rockfish	--	0.0013	0.0381	--	--	--	--	--	--	0.0008	0.0197	0.0047	0.0001
Tiger Rockfish	--	--	--	--	--	--	--	--	--	--	--	0.0000	--
Minor slope rockfish (North of 40°10' N. lat.)													
Aurora Rockfish	--	0.0068	0.0003	--	--	--	--	--	--	0.0041	0.0002	0.0003	0.0044
Bank Rockfish	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0004
Blackgill Rockfish	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0003
Redbanded Rockfish	--	0.0004	0.0002	--	--	--	--	--	--	0.0003	0.0001	0.0001	0.0009
Rougheye/Blackspotted Rockfish	--	--	--	--	--	--	--	--	--	--	--	0.0004	0.0046
Sharpchin Rockfish	--	0.0001	0.0000	--	--	--	--	--	--	0.0001	0.0000	0.0001	0.0008
Shortraker Rockfish	--	--	--	--	--	--	--	--	--	--	--	0.0002	0.0004
Slope Rockfish Unid	--	0.0023	--	--	--	--	--	--	--	0.0014	--	0.0005	0.0173
Splitnose Rockfish	--	0.0207	0.0022	--	--	--	--	--	--	0.0126	0.0011	0.0003	0.0014
Yellowmouth Rockfish	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0004
Mixed thornyheads													
Shortspine/Longspine Thornyhead	--	--	--	--	--	--	--	--	--	--	--	--	0.0002
Other flatfish													
Butter Sole	0.0001	0.0000	0.0001	--	--	--	--	--	--	0.0000	0.0000	0.0000	0.0000
Curlfin Sole	0.0002	--	0.0001	--	--	--	--	--	--	--	0.0001	0.0001	0.0000
Flatfish Unid	0.0001	--	0.0001	--	--	--	--	--	--	--	0.0000	0.0005	--
Flathead Sole	0.0644	0.0004	0.0393	--	--	--	--	--	--	0.0002	0.0203	0.0077	0.0010
Pacific Sanddab	0.1108	0.0004	0.0677	--	--	--	--	--	--	0.0003	0.0350	0.0144	0.0001
Rex Sole	0.2492	0.0009	0.1522	--	--	--	--	--	--	0.0006	0.0787	0.0499	0.0341
Rock Sole	0.0005	0.0001	0.0003	--	--	--	--	--	--	0.0000	0.0001	0.0002	0.0000
Sand Sole	0.0014	0.0000	0.0008	--	--	--	--	--	--	0.0000	0.0004	0.0005	0.0000
Sanddab Unid	0.0004	--	0.0002	--	--	--	--	--	--	--	0.0001	0.0001	--

Table 2a (continued).

		IFQ - Bottom Trawl (North of 40°10' N Lat.)													
Season	Depth (fm)	Expansion Factor (mt)	IFQFF	IFQM		NIFQ						All Discarded Species		All Species	
			Summer	Winter	Summer	Winter			Summer			Winter	Summer	Summer	
			0-125	126-250	0-125	0-125	126-250	>250	0-125	126-250	>250	126-250	0-125	0-125	126-250
			7.9039	0.1361	0.5897	0.5176	2.1682	1.7940	4.6256	0.8437	0.5874	1.1045	0.3175	3.1752	0.4536
Other groundfish															
Kelp Greenling (Oregon)			--	--	--	0.0000	--	--	0.0000	--	--	--	0.0000	0.0000	0.0000
Kelp Greenling (Washington)			--	--	--	0.0004	--	--	0.0002	0.0000	--	--	0.0001	0.0000	0.0000
Other rockfish															
Rockfish Unid			--	--	--	--	--	--	--	--	--	--	--	0.0000	--
Pacific cod			--	--	0.0002	--	--	--	--	--	--	--	0.0001	0.0085	0.0003
Pacific hake			--	0.4609	0.1720	--	--	--	--	--	--	0.2807	0.0889	0.0199	0.0373
Pacific ocean perch (North of 40°10' N. lat.)			--	0.0018	0.0003	--	--	--	--	--	--	0.0011	0.0002	0.0005	0.0042
Petrale sole			0.0276	0.0170	0.0169	--	--	--	--	--	--	0.0103	0.0087	0.2046	0.0378
Sablefish (North of 36° N. lat.)			--	0.0114	0.0643	--	--	--	--	--	--	0.0069	0.0332	0.0207	0.0961
Shortbelly rockfish			--	--	--	--	0.0000	--	0.0001	0.0000	--	0.0000	0.0000	0.0000	0.0000
Shortspine thornyhead (North of 34°27' N. lat.)			--	0.0035	0.0002	--	--	--	--	--	--	0.0021	0.0001	0.0032	0.0901
Spiny dogfish			--	--	--	0.2556	0.3948	0.0944	0.1188	0.2427	0.0158	0.1544	0.0574	0.0119	0.0086
Starry flounder			0.000114	--	6.99E-05	--	--	--	--	--	--	--	0.0000	0.0005	0.0000
Widow rockfish			--	--	0.0002	--	--	--	--	--	--	--	0.0001	0.0060	0.0014
YELLOWEYE ROCKFISH			--	--	0.0000	--	--	--	--	--	--	--	0.0000	0.0000	0.0000
Yellowtail rockfish (North of 40°10' N. lat.)			--	--	0.0001	--	--	--	--	--	--	--	0.0000	0.0383	0.0006
Nongroundfish species															
Dungeness crab			--	--	--	0.2267	0.0028	0.0003	0.3422	0.0092	0.0015	0.0011	0.1653	0.0343	0.0003
Non-FMP flatfish															
Deepsea Sole			--	--	--	--	0.0007	0.0135	0.0002	0.0011	0.0268	0.0003	0.0001	0.0000	0.0000
Slender Sole			--	--	--	0.1176	0.0025	0.0011	0.1232	0.0005	0.0001	0.0010	0.0595	0.0123	0.0000
Other nongroundfish															
Sculpin Unid			--	--	--	0.0007	0.0000	0.0000	0.0015	0.0000	--	0.0000	0.0007	0.0002	0.0000
Skate Unid			--	--	--	--	0.0001	0.0001	0.0008	0.0003	0.0011	0.0000	0.0004	0.0317	0.0070
Squid Unid			--	--	--	--	--	0.0000	--	0.0010	--	--	--	0.0000	0.0001
Starry Skate			--	--	--	--	0.0006	--	--	--	--	0.0002	--	--	--
Shared ecosystem component species															
Bristlemouth Unid			--	--	--	--	--	--	--	--	0.0000	--	--	--	--
Lanternfish Unid			--	--	--	--	0.0000	0.0000	--	--	0.0000	0.0000	--	--	--
Lightfish Unid			--	--	--	--	--	0.0000	--	0.0000	--	--	--	--	0.0000
Non-Eulachon Smelt Unid			--	--	--	--	--	--	0.0000	--	0.0001	--	0.0000	0.0000	--
Non-Humboldt Squid Unid			--	--	--	0.0005	0.0220	0.0283	0.0011	0.0400	0.0201	0.0086	0.0005	0.0001	0.0014
Pacific Saury			--	--	--	--	0.0000	0.0000	--	0.0000	--	0.0000	--	--	0.0000



**Table 2b. IFQ Discard Ratios, Bottom Trawl, South of 40°10' N.**

Values used to calculate the expanded weight of groundfish species from each WCGOP unsampled catch category in the observed IFQ fisheries: bottom trawl gear south of 40°10' N. latitude. A small amount of effort occurred in an EFP that used EM and an observer on all hauls to explore potential changes to discard handling; this data is included here as 100% observed bottom trawl effort. Expansion factors for each season and depth strata are shown in the top row. Discard ratios for each species are presented by season and depth strata in the rest of the table. Winter season is November-April, and summer season is May-October. Only strata with unsampled discard weight are shown. Unsampled catch weight is assigned to the following categories: IFQ flatfish species (IFQFF), IFQ rockfish species (IFQRF), IFQ roundfish species (IFQRD), IFQ mixed species (IFQM), non-IFQ species (NIFQ), all discarded species (IFQ & non-IFQ), all species (IFQ & non-IFQ), and all failed data. See Table A-2 for a list of species included in each unsampled category.

	Bottom Trawl (South of 40°10' N Lat.)		Hook and Line (Coastwide)	
	NIFQ	All Discarded Species	All Discarded Species	Failed Data
	Summer	Summer	Summer	Summer
	>250	0-250	All depths	All depths
Expansion Factor (mt)	0.0345	0.0499	0.0121	0.4747
<b>Groundfish species</b>				
Arrowtooth flounder	--	0.1515	0.1275	0.0298
Big skate	--	0.0020	0.0002	0.0000
Bocaccio rockfish (South of 40°10' N. lat.)	--	0.0010	--	--
Chilipepper rockfish (South of 40°10' N. lat.)	--	0.1160	--	--
Dover sole	--	0.0227	0.0001	0.0000
Ecosystem component species				
Black Skate	0.0236	0.0002	0.0061	0.0014
California Grenadier	0.0011	--	--	--
California Skate	--	0.0062	--	--
Deepsea Skate	0.0007	--	--	--
Giant Grenadier	0.1590	--	0.0048	0.0011
Grenadier Unid	0.0003	--	--	--
Pacific Flatnose	0.0000	--	--	--
Pacific Grenadier	0.1179	0.0003	0.0004	0.0001
Sandpaper Skate	0.0085	0.0029	0.0087	0.0020
Spotted Ratfish	0.0050	0.0526	0.0028	0.0007
English sole	--	0.0642	--	--
Lingcod (South of 40°10' N. lat.)	--	0.0164	0.0003	0.0001
Longnose skate	0.1128	0.0914	0.0186	0.0044
Longspine thornyhead (North of 34°27' N. lat.)	--	0.0007	--	--
Minor nearshore rockfish (South of 40°10' N. lat.)				
Copper Rockfish	--	--	0.0001	0.0000
Minor shelf rockfish (North of 40°10' N. lat.)				
Rosethorn Rockfish	--	--	0.0000	0.0000
Minor shelf rockfish (South of 40°10' N. lat.)				
Greenspotted Rockfish	--	0.0001	--	--
Greenstriped Rockfish	--	0.0021	--	--
Halfbanded Rockfish	--	0.0000	--	--
Rosethorn Rockfish	--	0.0000	--	--
Stripetail Rockfish	--	0.0160	--	--

**Table 2b (continued).**

	Bottom Trawl (South of 40°10' N Lat.)		Hook and Line (Coastwide)	
	NIFQ	All Discarded Species	All Discarded Species	Failed Data
	Season	Summer	Summer	Summer
	Depth (fm)	>250	0-250	All depths
Expansion Factor (mt)	0.0345	0.0499	0.0121	0.4747
Minor slope rockfish (North of 40°10' N. lat.)				
Redbanded Rockfish	--	--	0.0003	0.0001
Rougheye/Blackspotted Rockfish	--	--	0.0031	0.0007
Shortraker Rockfish	--	--	0.0005	0.0001
Shortraker/Rougheye/Blackspotted Rockfish	--	--	0.0012	0.0003
Minor slope rockfish (South of 40°10' N. lat.)				
Aurora Rockfish	--	0.0185	--	--
Bank Rockfish	--	0.0002	--	--
Blackgill Rockfish	--	0.0000	--	--
Redbanded Rockfish	--	0.0015	--	--
Other flatfish				
Curlfin Sole	--	0.0009	--	--
Pacific Sanddab	--	0.0984	--	--
Rex Sole	--	0.0139	--	--
Rock Sole	--	0.0011	--	--
Pacific cod	--	--	0.0001	0.0000
Pacific hake	--	0.1631	--	--
Petrale sole	--	0.0122	0.0001	0.0000
Sablefish (North of 36° N. lat.)	--	0.0027	0.0684	0.0160
Shortbelly rockfish	--	0.0013	--	--
Shortspine thornyhead (North of 34°27' N. lat.)	--	0.0000	0.0009	0.0002
Spiny dogfish	0.0012	0.0044	0.4947	0.1158
Splitnose rockfish (South of 40°10' N. lat.)	--	0.0097	--	--
Widow rockfish	--	0.0002	--	--
Yellowtail rockfish (North of 40°10' N. lat.)	--	--	0.0001	0.0000
<b>Non-groundfish species</b>				
Dungeness crab	--	0.0682	0.0000	0.0000
Non-FMP flatfish				
Deepsea Sole	0.0379	--	--	--
Slender Sole	--	0.0000	--	--
Other nongroundfish				
Sculpin Unid	--	0.0003	--	--
Squid Unid	0.0014	0.0034	--	--
Starry Skate	--	0.0003	--	--
Shared ecosystem component species				
Non-Humboldt Squid Unid	0.0063	0.0046	--	--
Pacific Saury	0.0000	--	--	--

**Table 2c. Non-IFQ species in EM Catch Shares**

Observed at-sea and shoreside discard ratios and standard errors thereof, at-sea and shoreside discard coefficients of variations, estimated discard (mt), landings (mt), and fishing mortality estimates (mt) of non-IFQ species in the electronically monitored (EM) catch shares fishery using bottom trawl and pot gear. Ratios are computed as the observed at-sea or estimated shoreside discard weight divided by the observed weight of retained groundfish (adjusted to fish tickets) in the catch shares EM fishery. Discard ratios were multiplied by landings of groundfish in the EM fleet to generate estimated discard. Estimates for IFQ species come directly from the EM systems and are in Table 2d.

Non-IFQ species in EM Catch Shares	Trawl - North											Trawl - South											Pot - North													Pot - South										
	Observed			Expansion factor:								Observed			Expansion factor:								Observed			Expansion factor:								Observed			Expansion factor:									
	Vessels	Trips	Hauls	Fleet landings of groundfish (mt)					Vessels	Trips	Hauls	Fleet landings of groundfish (mt)					Vessels	Trips	Hauls	Fleet landings of groundfish (mt)					Vessels	Trips	Hauls	Fleet landings of groundfish (mt)																		
	5	11	63	1503					3	14	87	550					4	14	163	279					5	8	107	225																		
	At-Sea				Estimated Shoreside					Total	At-Sea				Estimated Shoreside					Total	At-Sea				Estimated Shoreside					Total	At-Sea				Estimated Shoreside					Total						
	Discard Ratio	SE	CV	Discard	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard Ratio	SE	CV	Discard	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard Ratio	SE	CV	Discard	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard Ratio	SE	CV	Discard	Landed	Estimate										
Groundfish species	--	--	--	--	--	--	--	1.61	1.61	0.0033	0.0011	0.3407	1.83	--	--	--	--	--	1.75	3.57	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--									
Big skate	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--									
50% discard mortality (Trawl)‡																																														
Ecosystem component species																																														
Black Skate	0.0014	0.0003	0.1931	2.07	--	--	--	--	2.07	0.0007	0.0002	0.2505	0.41	--	--	--	--	--	--	0.41	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--								
California Grenadier	0.0000	0.0000	0.3377	0.01	--	--	--	--	0.01	0.0000	0.0000	0.5686	0.02	--	--	--	--	--	--	0.02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--								
California Skate	--	--	--	--	--	--	--	--	--	0.0006	0.0001	0.2287	0.31	--	--	--	--	--	--	0.25	0.57	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--								
Giant Grenadier	0.0055	0.0015	0.2725	8.20	--	--	--	--	8.20	0.0098	0.0030	0.3091	5.36	--	--	--	--	--	--	5.36	0.0011	0.0003	0.2539	0.32	--	--	--	--	--	--	0.32	0.0002	0.0001	0.4827	0.04	--	--	0.04								
Grenadier Unid	--	--	--	--	--	--	--	2.26	2.26	--	--	--	--	--	--	--	--	--	0.03	0.03	0.0001	0.0000	0.1892	0.03	--	--	--	--	--	--	0.03	--	--	--	--	--	--									
Pacific Flatnose	0.0000	0.0000	0.2267	0.00	--	--	--	--	0.00	0.0000	0.0000	0.0898	0.00	--	--	--	--	--	0.00	0.00	0.0001	0.0000	0.3096	0.01	--	--	--	--	--	--	0.01	--	--	--	--	--	--									
Pacific Grenadier	0.0013	0.0003	0.2177	1.98	--	--	--	--	1.98	0.0004	0.0002	0.3887	0.21	--	--	--	--	--	0.14	0.36	0.0014	0.0003	0.2303	0.39	--	--	--	--	--	--	0.39	0.0001	0.0000	0.1653	0.03	--	--	0.03								
Popeye Grenadier	0.0000	0.0000	0.0781	0.00	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--								
Sandpaper Skate	0.0011	0.0002	0.2156	1.69	--	--	--	--	1.69	0.0007	0.0002	0.2057	0.41	--	--	--	--	--	--	0.41	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.0735	0.00	--	--	0.00								
Soupin Shark	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.04	0.04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--									
Spotted Ratfish	0.0010	0.0005	0.4612	1.58	--	--	--	--	1.58	0.0050	0.0015	0.3005	2.76	--	--	--	--	--	0.11	2.87	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--									
Longnose skate	0.0014	0.0004	0.2596	2.17	--	--	--	60.51	61.60	0.0115	0.0018	0.1587	6.34	--	--	--	--	--	10.60	13.78	0.0001	0.0000	0.1358	0.02	--	--	--	--	--	0.01	0.0000	0.0000	0.0735	0.01	--	--	--	0.00								
50% discard mortality (Trawl)‡																																														
50% discard mortality (Fixed Gear)‡																																														
Minor nearshore rockfish (South of 40°10' N. lat.)																																														
Brown Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--									
Shortbelly rockfish	--	--	--	--	--	--	--	0.09	0.09	0.0000	0.0000	0.0898	0.00	--	--	--	--	--	0.35	0.35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--									
Spiny dogfish	0.0000	0.0000	0.0781	0.02	--	--	--	0.00	0.02	0.0053	0.0018	0.3427	2.92	--	--	--	--	--	0.01	2.93	0.0003	0.0001	0.3311	0.09	--	--	--	--	--	0.09	0.0000	0.0000	0.0735	0.00	--	--	--	0.00								
Non-groundfish species																																														
Dungeness crab	0.0000	0.0000	0.4712	0.03	--	--	--	--	0.03	0.0053	0.0017	0.3252	2.89	--	--	--	--	--	2.89	0.0017	0.0005	0.3011	0.48	--	--	--	--	--	0.48	0.0000	0.0000	0.1232	0.01	--	--	--	0.01									
Non-FMP flatfish																																														
Deepsea Sole	0.0003	0.0002	0.5678	0.44	--	--	--	--	0.44	0.0000	0.0000	0.0898	0.00	--	--	--	--	--	0.00	0.0000	0.0000	0.2408	0.00	--	--	--	--	--	--	0.00	--	--	--	--	--	--	--									
Slender Sole	0.0000	0.0000	0.0781	0.01	--	--	--	--	0.01	0.0000	0.0000	0.4760	0.00	0.0000	0.0000	0.3025	0.00	0.11	0.11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--									
Other nongroundfish																																														
Sculpin Unid	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.1996	0.03	--	--	--	--	--	0.00	0.03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--									
Skate Unid	--	--	--	--	--	--	--	0.66	0.66	0.0005	0.0000	0.0898	0.27	--	--	--	--	--	0.03	0.30	--	--	--	--	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--									
Squid Unid	0.0001	0.0000	0.0781	0.11	--	--	--	--	0.11	--	--	--	--	--	--	--	--	--	0.04	0.04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--									
Shared ecosystem component species																																														
Deepsea Smelt Unid	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.0898	0.00	--	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--									
Lanternfish Unid	0.0000	0.0000	0.0781	0.00	--	--	--	--	0.00	0.0000	0.0000	0.2901	0.00	--	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--									
Non-Humboldt Squid Unid	0.0004	0.0001	0.1972	0.64	--	--	--	--	0.64	0.0000	0.0003	0.3887	0.40	--	--	--	--	--	0.40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--									
Pacific Saury	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.0898	0.00	--	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--									

‡Mortality rates provided by the Groundfish Management Team (GMT).

**Table 2d. IFQ species in EM Catch Shares**

Electronically monitored (EM) estimated discard (mt), landings (mt), and fishing mortality estimates (mt) of IFQ species in the EM catch shares bottom trawl and pot fisheries. Discard amounts are derived from the EM program and include FOS-estimated expansions of the small amount of unsampled at-sea discard.

IFQ species in EM Catch Shares	Trawl - North			Trawl - South			Pot - North			Pot - South		
	EM vessels	EM tows	Fleet landings of groundfish (mt)	EM vessels	EM tows	Fleet landings of groundfish (mt)	EM vessels	EM tows	Fleet landings of groundfish (mt)	EM vessels	EM tows	Fleet landings of groundfish (mt)
	8	456	1,503	3	414	550	5	578	279	6	648	225
	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate
Weight (mt)												
<b>Groundfish species</b>												
Arrowtooth flounder	14.22	33.83	48.06	15.87	0.18	16.05	0.13	0.05	0.18	0.00	0.00	0.00
Bocaccio rockfish (South of 40°10' N. lat.)	--	--	--	0.09	36.36	36.45	--	--	--	--	--	--
Canary rockfish	0.00	0.16	0.16	0.00	0.60	0.60	--	--	--	--	--	--
Chilipepper rockfish (South of 40°10' N. lat.)	--	--	--	0.03	22.89	22.92	--	--	--	--	--	--
COWCOD ROCKFISH (South of 40°10' N. lat.)	--	--	--	0.00	0.33	0.34	--	--	--	--	--	--
Darkblotched rockfish	0.00	4.33	4.33	0.00	0.26	0.26	--	0.01	0.01	--	--	--
Dover sole	1.44	848.69	850.13	0.38	129.70	130.08	0.20	0.26	0.46	0.00	0.06	0.06
English sole	0.05	7.43	7.48	11.39	6.35	17.73	--	0.00	0.00	--	0.00	0.00
Lingcod (North of 40°10' N. lat.)	0.01	3.22	3.22	--	--	--	0.14	0.30	0.45	--	--	--
50% discard mortality (Trawl)‡	0.01											
Lingcod (South of 40°10' N. lat.)	--	--	--	2.69	12.37	15.06	--	--	--	0.05	0.06	0.11
50% discard mortality (Trawl)‡												
Longspine thornyhead (North of 34°27' N. lat.)	0.04	149.65	149.69	0.02	75.18	75.20	--	0.01	0.01	--	0.01	0.01
Minor shelf rockfish (North of 40°10' N. lat.)												
Bocaccio Rockfish	0.00	0.70	0.70	--	--	--	0.00	--	0.00	--	--	--
Chilipepper Rockfish	0.18	1.81	1.99	--	--	--	--	--	--	--	--	--
Greenstriped Rockfish	0.00	0.70	0.70	--	--	--	--	--	--	--	--	--
Redstripe Rockfish	--	3.52	3.52	--	--	--	--	--	--	--	--	--
Shelf Rockfish Unid	0.00	0.00	0.00	--	--	--	--	0.00	0.00	--	--	--
Stripetail Rockfish	0.00	0.25	0.25	--	--	--	--	--	--	--	--	--
Minor shelf rockfish (South of 40°10' N. lat.)												
Flag Rockfish	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Greenblotched Rockfish	--	--	--	0.00	0.01	0.01	--	--	--	--	--	--
Greenspotted Rockfish	--	--	--	0.00	0.11	0.11	--	--	--	--	--	--
Greenstriped Rockfish	--	--	--	0.00	0.25	0.25	--	--	--	--	--	--
Halfbanded Rockfish	--	--	--	0.00	0.00	0.00	--	--	--	--	--	--
Mexican Rockfish	--	--	--	0.00	0.00	0.00	--	--	--	--	--	--
Pink Rockfish	--	--	--	0.00	0.02	0.02	--	--	--	--	--	--
Rosethorn Rockfish	--	--	--	0.00	0.00	0.00	--	--	--	--	--	--
Rosy Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	--	--

‡Mortality rates provided by the Groundfish Management Team (GMT).

**Table 2d (continued).**

IFQ species in EM Catch Shares	Trawl - North			Trawl - South			Pot - North			Pot - South		
	EM vessels	EM tows	Fleet landings of groundfish (mt)	EM vessels	EM tows	Fleet landings of groundfish (mt)	EM vessels	EM tows	Fleet landings of groundfish (mt)	EM vessels	EM tows	Fleet landings of groundfish (mt)
	8	456	1,503	3	414	550	5	578	279	6	648	225
	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate
Weight (mt)												
Shelf Rockfish Unid	--	--	--	0.00	--	0.00	--	--	--	--	--	--
Silvergray Rockfish	--	--	--	0.00	0.04	0.04	--	--	--	--	--	--
Stripetail Rockfish	--	--	--	0.00	0.12	0.12	--	--	--	--	--	--
Vermilion Rockfish	--	--	--	0.00	0.06	0.06	--	--	--	--	--	--
Yellowtail Rockfish	--	--	--	0.00	0.02	0.02	--	--	--	--	--	--
Minor slope rockfish (North of 40°10' N. lat.)												
Aurora Rockfish	0.00	1.38	1.38	--	--	--	--	0.00	0.00	--	--	--
Bank Rockfish	0.00	0.11	0.11	--	--	--	--	0.00	0.00	--	--	--
Blackgill Rockfish	0.00	0.37	0.37	--	--	--	0.00	0.00	0.01	--	--	--
Redbanded Rockfish	0.00	0.96	0.96	--	--	--	0.02	0.15	0.17	--	--	--
Rougheye/Blackspotted Rockfish	0.00	0.12	0.12	--	--	--	--	0.15	0.15	--	--	--
Sharpchin Rockfish	0.00	0.00	0.00	--	--	--	--	0.00	0.00	--	--	--
Shortraker Rockfish	0.00	0.03	0.03	--	--	--	--	--	--	--	--	--
Shortraker/Rougheye/Blackspotted Rockfish	--	--	--	--	--	--	0.02	--	0.02	--	--	--
Slope Rockfish Unid	0.01	0.09	0.10	--	--	--	--	--	--	--	--	--
Splitnose Rockfish	0.00	0.41	0.41	--	--	--	--	0.00	0.00	--	--	--
Yellowmouth Rockfish	--	2.16	2.16	--	--	--	--	--	--	--	--	--
Minor slope rockfish (South of 40°10' N. lat.)												
Aurora Rockfish	--	--	--	0.00	2.05	2.05	--	--	--	0.00	0.01	0.01
Bank Rockfish	--	--	--	0.02	5.04	5.06	--	--	--	--	--	--
Blackgill Rockfish	--	--	--	0.00	7.55	7.55	--	--	--	--	0.61	0.61
Pacific Ocean Perch	--	--	--	0.00	0.00	0.00	--	--	--	--	--	--
Redbanded Rockfish	--	--	--	0.00	0.03	0.03	--	--	--	--	--	--
Rougheye/Blackspotted Rockfish	--	--	--	0.00	0.01	0.01	--	--	--	--	--	--
Shortraker Rockfish	--	--	--	0.00	0.01	0.01	--	--	--	--	--	--
Slope Rockfish Unid	--	--	--	0.00	0.11	0.11	--	--	--	--	--	--
Mixed thornyheads												
Shortspine/Longspine Thornyhead	0.07	--	0.07	0.01	--	0.01	0.01	--	0.01	0.00	--	0.00
Other flatfish												
Curlfin Sole	--	--	--	0.00	0.09	0.09	--	--	--	--	--	--
Flatfish Unid	0.09	--	0.09	0.10	0.00	0.10	0.00	0.00	0.01	--	--	--
Flathead Sole	--	--	--	--	0.00	0.00	--	--	--	--	--	--

**Table 2d (continued).**

IFQ species in EM Catch Shares	Trawl - North			Trawl - South			Pot - North			Pot - South		
	EM vessels	EM tows	Fleet landings of groundfish (mt)	EM vessels	EM tows	Fleet landings of groundfish (mt)	EM vessels	EM tows	Fleet landings of groundfish (mt)	EM vessels	EM tows	Fleet landings of groundfish (mt)
	8	456	1,503	3	414	550	5	578	279	6	648	225
	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate
Weight (mt)												
Pacific Sanddab	--	0.34	0.34	7.04	21.89	28.93	--	--	--	--	--	--
Rex Sole	0.05	24.25	24.31	0.05	4.79	4.84	--	0.00	0.00	--	--	--
Rock Sole	0.00	--	0.00	0.00	0.12	0.12	--	--	--	--	--	--
Sand Sole	--	--	--	0.00	0.49	0.49	--	--	--	--	--	--
Sanddab Unid	--	--	--	0.00	0.97	0.97	--	--	--	--	--	--
Other rockfish												
Rockfish Unid	0.03	--	0.03	0.09	--	0.09	0.00	--	0.00	0.00	--	0.00
Pacific hake	5.96	0.28	6.25	7.68	2.44	10.12	--	--	--	0.01	--	0.01
Pacific ocean perch (North of 40°10' N. lat.)	0.00	0.24	0.24	--	--	--	--	0.00	0.00	--	--	--
Petrable sole	0.13	114.04	114.17	0.09	137.70	137.80	0.01	0.01	0.02	--	0.00	0.00
Sablefish (North of 36° N. lat.)	0.16	168.57	168.65	0.02	49.20	49.21	5.73	278.18	279.32	0.94	135.03	135.22
50% discard mortality (Trawl)‡	0.08			0.01								
20% discard mortality (Fixed Gear)‡							1.15			0.19		
Sablefish (South of 36° N. lat.)	--	--	--	0.00	0.25	0.25	--	--	--	0.93	88.88	89.07
50% discard mortality (Trawl)‡				0.00								
20% discard mortality (Fixed Gear)‡										0.19		
Shortspine thornyhead (North of 34°27' N. lat.)	0.05	66.97	67.03	0.00	18.47	18.48	0.07	0.27	0.34	0.08	0.47	0.55
Shortspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--
Splitnose rockfish (South of 40°10' N. lat.)	--	--	--	0.01	2.38	2.39	--	--	--	--	--	--
Starry flounder	--	2.69	2.69	--	--	--	--	--	--	--	--	--
Widow rockfish	0.00	1.12	1.12	0.00	0.31	0.31	--	--	--	--	--	--
YELLOWEYE ROCKFISH	--	--	--	0.00	0.01	0.01	--	--	--	--	--	--
Yellowtail rockfish (North of 40°10' N. lat.)	0.00	0.01	0.01	--	--	--	--	--	--	--	--	--

**Table 2e. Discard in EM Midwater trawl**

Electronically monitored (EM) estimated discard (mt), landings (mt), and fishing mortality estimates (mt) of groundfish species in the EM catch shares midwater fisheries. Discard amounts are derived from the EM program and include FOS-estimated expansions of the small amount of unsampled at-sea discard.

EM Midwater	Midwater Rockfish Trawl			Midwater Hake Trawl		
	EM vessels	EM tows	Fleet landings of groundfish (mt)	EM vessels	EM tows	Fleet landings of hake (mt)
	10	88	1,570	22	2072	133,135
	Discard	Landed	Estimate	Discard	Landed	Estimate
Weight (mt)						
<b>Groundfish species</b>						
Arrowtooth flounder	0.00	0.01	0.01	0.05	6.24	6.29
Big skate	0.00	0.04	0.04	0.01	1.13	1.13
Canary rockfish	0.00	17.51	17.51	0.54	64.01	64.55
Darkblotched rockfish	0.00	0.00	0.00	0.46	30.95	31.40
Dover sole	--	--	--	0.00	0.01	0.01
Ecosystem component species						
Soupfin Shark	--	0.02	0.02	0.00	0.45	0.45
English sole	0.00	0.00	0.00	0.00	0.01	0.01
Groundfish unid	--	--	--	0.00	0.19	0.19
Lingcod (North of 40°10' N. lat.)	0.00	0.71	0.72	0.12	7.17	7.30
Longnose skate	0.00	0.03	0.03	0.00	0.35	0.35
Longspine thornyhead (North of 34°27' N. lat.)	--	--	--	0.00	0.00	0.00
Minor nearshore rockfish (North of 40°10' N. lat.)						
Blue/Deacon Rockfish	--	--	--	0.00	0.00	0.00
Nearshore Rockfish Unid	--	--	--	--	0.00	0.00
Minor shelf rockfish (North of 40°10' N. lat.)						
Bocaccio Rockfish	0.00	0.32	0.33	0.04	4.42	4.46
Chilipepper Rockfish	0.00	3.42	3.42	0.20	48.45	48.65
Greenstriped Rockfish	0.00	0.05	0.05	0.00	0.09	0.09
Harlequin Rockfish	0.00	0.01	0.01	0.00	0.08	0.08
Redstripe Rockfish	0.00	4.06	4.06	0.08	15.03	15.11
Shelf Rockfish Unid	--	--	--	0.00	0.02	0.02
Silvergray Rockfish	0.00	0.12	0.12	0.02	3.99	4.01
Stripetail Rockfish	--	0.01	0.01	--	--	--

**Table 2e (continued).**

EM Midwater	Midwater Rockfish Trawl			Midwater Hake Trawl		
	EM vessels	EM tows	Fleet landings of groundfish (mt)	EM vessels	EM tows	Fleet landings of hake (mt)
	10	88	1,570	22	2072	133,135
	Discard	Landed	Estimate	Discard	Landed	Estimate
Weight (mt)						
Silvergray Rockfish	0.00	0.12	0.12	0.02	3.99	4.01
Stripetail Rockfish	--	0.01	0.01	--	--	--
Minor slope rockfish (North of 40°10' N. lat.)						
Aurora Rockfish	--	--	--	0.01	0.37	0.38
Rougheye/Blackspotted Rockfish	--	--	--	0.01	2.33	2.34
Sharpchin Rockfish	0.00	0.03	0.03	0.01	2.24	2.26
Shortraker Rockfish	--	--	--	0.00	0.07	0.07
Slope Rockfish Unid	--	--	--	0.00	5.46	5.46
Splitnose Rockfish	0.00	0.01	0.01	0.04	34.78	34.81
Yellowmouth Rockfish	0.00	0.00	0.00	0.00	0.04	0.04
Other flatfish						
Flatfish Unid	0.00	0.00	0.00	0.00	0.01	0.01
Flathead Sole	--	0.00	0.00	0.00	0.00	0.00
Pacific Sanddab	--	0.00	0.00	--	0.00	0.00
Rex Sole	--	--	--	0.00	0.04	0.04
Rock Sole	--	--	--	0.00	0.00	0.00
Other rockfish						
Rockfish Unid	0.68	--	0.68	0.01	--	0.01
Pacific cod	0.00	0.18	0.18	0.01	0.59	0.60
Pacific hake	5.16	158.68	163.84	1,679.08	133,134.74	134,813.82
Pacific ocean perch (North of 40°10' N. lat.)	0.00	0.07	0.07	0.37	46.02	46.39
Petrale sole	--	0.00	0.00	0.00	0.04	0.04
Roundfish unid	--	--	--	0.02	--	0.02
Sablefish (North of 36° N. lat.)	0.00	0.07	0.07	1.47	91.27	92.74
Shortbelly rockfish	0.00	0.23	0.23	0.20	119.91	120.11
Shortspine thornyhead (North of 34°27' N. lat.)	0.00	0.00	0.00	0.01	0.98	0.99
Spiny dogfish	0.00	0.01	0.01	1.44	89.21	90.65
Widow rockfish	9.73	1,257.71	1,267.45	3.65	906.64	910.29



**Table 2e (continued).**

EM Midwater	Midwater Rockfish Trawl			Midwater Hake Trawl		
	EM vessels	EM tows	Fleet landings of groundfish (mt)	EM vessels	EM tows	Fleet landings of hake (mt)
	10	88	1,570	22	2072	133,135
	Discard	Landed	Estimate	Discard	Landed	Estimate
Weight (mt)						
YELLOW EYE ROCKFISH	--	--	--	0.00	0.00	0.00
Yellowtail rockfish (North of 40°10' N. lat.)	0.83	285.13	285.96	8.55	1,191.08	1,199.63
<b>Non-groundfish species</b>						
Dungeness crab	--	--	--	0.00	0.00	0.00
Other nongroundfish						
Skate Unid	--	--	--	0.00	0.11	0.11
Squid Unid	0.00	0.03	0.03	0.16	16.82	16.98

**Table 3a. Observed Sectors: Non-hake IFQ Fishing Mortality Estimates by Sector.**

Non-hake IFQ sector totals, including the EM portion of the fleet. Landings (mt), estimated discard (mt), and fishing mortality estimate (mt) of groundfish species from non-hake IFQ fisheries. Discard ratios (Tables 2a, 2b) were multiplied by expansion factors to generate estimated discard and summarized with sampled discard at the sector level. Estimated total discard of non-IFQ species on observed EM trips were combined with total at-sea discard weight of IFQ species as recorded by EM systems. Discard mortality rates have been applied where appropriate. Finally, landings were summarized from PacFIN.

Weight (mt)	IFQ - Bottom Trawl			IFQ - Midwater Rockfish Trawl			IFQ - Hook-and-Line			IFQ - Pot		
	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate
<b>Groundfish species</b>												
Arrowtooth flounder	348.46	1,006.89	1,355.34	0.00	0.78	0.78	3.48	0.10	3.57	0.41	0.10	0.51
Big skate	17.84	202.64	220.48	0.00	1.26	1.26	0.00	0.13	0.13	--	--	--
Black rockfish (Oregon)	0.00	0.00	0.00	--	0.00	0.00	--	--	--	--	--	--
Black rockfish (Washington)	0.00	0.23	0.23	--	0.00	0.00	--	--	--	--	--	--
Bocaccio rockfish (South of 40°10' N. lat.)	0.12	87.43	87.55	--	--	--	--	0.06	0.06	--	--	--
Canary rockfish	0.10	133.09	133.19	0.00	34.39	34.40	--	0.01	0.01	--	--	--
Chillipepper rockfish (South of 40°10' N. lat.)	3.17	102.32	105.49	--	--	--	--	--	--	--	--	--
COWCOD ROCKFISH (South of 40°10' N. lat.)	0.00	0.42	0.42	--	--	--	--	--	--	--	--	--
Darkblotched rockfish	2.85	147.64	150.49	0.00	0.19	0.19	--	0.05	0.05	0.00	0.03	0.03
Dover sole	55.94	7,282.64	7,338.57	--	0.05	0.05	0.00	0.45	0.46	0.69	0.47	1.16
<b>Ecosystem component species</b>												
Aleutian Skate	0.63	--	0.63	--	--	--	--	--	--	--	--	--
Black Skate	10.72	--	10.72	--	--	--	0.17	--	0.17	--	--	--
California Grenadier	0.08	--	0.08	--	--	--	--	--	--	--	--	--
California Skate	0.57	0.64	1.22	--	--	--	--	--	--	--	--	--
Deepsea Skate	0.07	--	0.07	--	--	--	--	--	--	--	--	--
Giant Grenadier	44.57	--	44.57	--	--	--	0.13	--	0.13	0.90	--	0.90
Grenadier Unid	2.97	10.42	13.39	--	--	--	--	--	--	0.03	--	0.03
Pacific Flatnose	0.27	--	0.27	--	--	--	--	--	--	0.04	--	0.04
Pacific Grenadier	17.17	0.35	17.52	--	--	--	0.01	--	0.01	1.15	--	1.15
Popeye Grenadier	0.00	--	0.00	--	--	--	--	--	--	--	--	--
Sandpaper Skate	49.12	--	49.12	0.13	--	0.13	0.24	--	0.24	0.00	--	0.00
Shoulderspot Grenadier	0.00	--	0.00	--	--	--	--	--	--	--	--	--
Smooth Grenadier	0.00	--	0.00	--	--	--	--	--	--	--	--	--
Soupin Shark	0.18	0.72	0.91	--	0.02	0.02	--	--	--	--	--	--
Spotted Ratfish	78.51	1.16	79.66	0.58	0.31	0.89	0.08	--	0.08	--	--	--
English sole	42.03	204.26	246.29	0.00	0.23	0.23	--	--	--	--	0.00	0.00
Lingcod (North of 40°10' N. lat.)	12.66	580.47	593.14	0.03	2.39	2.43	--	0.18	0.18	0.49	2.38	2.87
Lingcod (South of 40°10' N. lat.)	1.72	20.52	22.24	--	--	--	0.00	0.16	0.16	0.13	0.06	0.18
Longnose skate	47.92	708.72	756.64	0.02	1.49	1.51	0.25	5.35	5.61	0.02	--	0.02
Longspine thornyhead (North of 34°27' N. lat.)	4.87	798.56	803.43	--	0.05	0.05	--	0.00	0.00	0.00	0.02	0.02
<b>Minor nearshore rockfish (North of 40°10' N. lat.)</b>												
Blue/Deacon Rockfish	0.00	0.00	0.00	--	--	--	--	--	--	--	--	--
Copper Rockfish	0.00	0.00	0.00	--	--	--	--	--	--	--	--	--
Nearshore Rockfish Unid	0.00	0.00	0.00	--	--	--	--	--	--	--	--	--
Quillback Rockfish	0.00	0.06	0.06	--	--	--	--	--	--	--	--	--
<b>Minor nearshore rockfish (South of 40°10' N. lat.)</b>												
Brown Rockfish	--	0.00	0.00	--	--	--	--	--	--	--	--	--
Copper Rockfish	--	--	--	--	--	--	0.00	--	0.00	--	--	--

Table 3a (continued).

Weight (mt)	IFQ - Bottom Trawl			IFQ - Midwater Rockfish Trawl			IFQ - Hook-and-Line			IFQ - Pot		
	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate
Minor shelf rockfish (North of 40°10' N. lat.)												
Bocaccio Rockfish	0.16	20.53	20.69	0.00	2.82	2.82	--	--	--	0.00	--	0.00
Chilipepper Rockfish	4.76	20.15	24.91	0.00	4.24	4.24	--	--	--	--	--	--
Cowcod Rockfish	0.00	0.00	0.00	--	--	--	--	--	--	--	--	--
Greenblotched Rockfish	0.00	--	0.00	--	--	--	--	--	--	--	--	--
Greenspotted Rockfish	0.03	0.09	0.12	--	0.00	0.00	--	--	--	--	--	--
Greenstriped Rockfish	24.92	20.55	45.48	0.00	0.11	0.12	--	0.01	0.01	0.00	--	0.00
Halfbanded Rockfish	0.00	--	0.00	--	--	--	--	--	--	--	--	--
Harlequin Rockfish	0.00	--	0.00	0.00	0.02	0.02	--	--	--	--	--	--
Pygmy Rockfish	0.02	--	0.02	--	--	--	--	--	--	--	--	--
Redstripe Rockfish	0.02	3.92	3.94	0.00	10.02	10.02	--	--	--	--	--	--
Rosethorn Rockfish	0.35	2.95	3.30	--	0.00	0.00	0.00	0.03	0.03	0.01	0.01	0.02
Rosy Rockfish	0.02	--	0.02	--	--	--	--	--	--	--	--	--
Shelf Rockfish Unid	0.08	24.46	24.54	--	0.04	0.04	--	--	--	--	0.00	0.00
Silvergray Rockfish	0.00	1.19	1.19	0.00	0.59	0.59	--	0.01	0.01	--	--	--
Starry Rockfish	0.03	--	0.03	--	--	--	--	--	--	--	--	--
Stripetail Rockfish	18.91	3.52	22.43	--	0.02	0.02	--	--	--	--	--	--
Tiger Rockfish	0.00	0.00	0.00	--	--	--	--	--	--	--	--	--
Minor shelf rockfish (South of 40°10' N. lat.)												
Flag Rockfish	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Greenblotched Rockfish	0.00	0.02	0.02	--	--	--	--	--	--	--	--	--
Greenspotted Rockfish	0.00	0.31	0.31	--	--	--	--	--	--	--	--	--
Greenstriped Rockfish	0.07	0.62	0.69	--	--	--	--	--	--	--	--	--
Halfbanded Rockfish	0.00	0.00	0.00	--	--	--	--	--	--	--	--	--
Mexican Rockfish	0.00	0.03	0.03	--	--	--	--	--	--	--	--	--
Pink Rockfish	0.00	0.02	0.02	--	--	--	--	--	--	--	--	--
Rosethorn Rockfish	0.01	0.00	0.01	--	--	--	--	--	--	--	--	--
Rosy Rockfish	--	0.00	0.00	--	--	--	--	--	--	--	--	--
Shelf Rockfish Unid	0.00	0.06	0.06	--	--	--	--	--	--	--	--	--
Silvergray Rockfish	0.00	0.04	0.04	--	--	--	--	--	--	--	--	--
Stripetail Rockfish	0.55	0.12	0.67	--	--	--	--	--	--	--	--	--
Vermilion Rockfish	0.00	0.06	0.06	--	--	--	--	0.22	0.22	--	--	--
Yellowtail Rockfish	0.00	0.04	0.04	--	--	--	--	--	--	--	--	--
Minor slope rockfish (North of 40°10' N. lat.)												
Aurora Rockfish	3.71	21.61	25.32	--	0.02	0.02	--	0.01	0.01	0.01	0.01	0.02
Bank Rockfish	0.00	2.45	2.45	--	0.02	0.02	--	--	--	--	0.00	0.00
Blackgill Rockfish	0.00	4.92	4.93	--	0.02	0.02	--	0.01	0.01	0.01	0.01	0.02
Redbanded Rockfish	0.27	6.15	6.42	--	0.00	0.00	0.01	0.90	0.91	0.04	0.23	0.26
Rougheye/Blackspotted Rockfish	0.00	24.63	24.63	--	0.43	0.43	0.09	7.04	7.12	0.04	0.78	0.82
Sharpchin Rockfish	0.06	4.09	4.15	0.00	0.13	0.13	--	--	--	--	0.00	0.00
Shortraker Rockfish	0.00	8.14	8.14	--	0.02	0.02	0.01	0.82	0.84	--	0.03	0.03
Shortraker/Rougheye/Blackspotted Rockfish	--	--	--	--	--	--	0.03	--	0.03	0.02	--	0.02
Slope Rockfish Unid	0.48	1.12	1.60	--	0.19	0.19	--	--	--	--	0.10	0.10
Splitnose Rockfish	6.33	15.81	22.14	0.00	1.12	1.12	--	0.00	0.00	--	0.00	0.00
Yellowmouth Rockfish	0.00	4.53	4.53	0.00	0.02	0.02	--	0.00	0.00	--	--	--

**Table 3a (continued).**

Weight (mt)	IFQ - Bottom Trawl			IFQ - Midwater Rockfish Trawl			IFQ - Hook-and-Line			IFQ - Pot		
	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate
Minor slope rockfish (South of 40°10' N. lat.)												
Aurora Rockfish	2.09	4.03	6.12	--	--	--	--	--	--	0.00	0.01	0.01
Bank Rockfish	0.05	33.44	33.49	--	--	--	--	--	--	--	--	--
Blackgill Rockfish	0.15	19.43	19.59	--	--	--	--	--	--	0.02	0.62	0.64
Pacific Ocean Perch	0.00	0.00	0.00	--	--	--	--	--	--	--	--	--
Redbanded Rockfish	0.04	0.32	0.37	--	--	--	--	--	--	--	--	--
Rougheye/Blackspotted Rockfish	0.00	0.02	0.02	--	--	--	--	--	--	--	--	--
Sharpchin Rockfish	0.00	0.00	0.00	--	--	--	--	--	--	--	--	--
Shortraker Rockfish	0.00	0.01	0.01	--	--	--	--	--	--	--	--	--
Slope Rockfish Unid	0.00	0.12	0.12	--	--	--	--	--	--	--	--	--
Mixed thornyheads												
Shortspine/Longspine Thornyhead	0.23	--	0.23	--	--	--	--	--	--	0.02	--	0.02
Other flatfish												
Butter Sole	0.03	0.00	0.03	--	--	--	--	--	--	--	--	--
Curlfin Sole	0.08	0.56	0.64	--	0.00	0.00	--	--	--	--	--	--
Flatfish Unid	0.22	2.91	3.13	0.00	0.00	0.00	--	--	--	0.00	0.00	0.01
Flathead Sole	21.76	18.99	40.75	--	0.27	0.27	--	--	--	--	--	--
Pacific Sanddab	57.56	64.41	121.97	--	0.02	0.02	--	--	--	--	--	--
Rex Sole	85.06	464.69	549.76	--	0.80	0.80	--	--	--	--	0.00	0.00
Rock Sole	0.23	1.25	1.47	--	0.00	0.00	--	--	--	--	--	--
Sand Sole	0.49	5.31	5.80	--	--	--	--	--	--	--	--	--
Sanddab Unid	0.12	4.19	4.31	--	--	--	--	--	--	--	--	--
Other groundfish												
Kelp Greenling (Oregon)	0.02	0.01	0.02	--	--	--	--	--	--	--	--	--
Kelp Greenling (Washington)	0.09	0.02	0.10	0.00	--	0.00	--	--	--	--	--	--
Other rockfish												
Rockfish Unid	0.11	0.08	0.19	0.68	--	0.68	--	--	--	0.00	--	0.00
Pacific cod	0.15	41.53	41.68	0.00	0.65	0.65	0.00	--	0.00	--	--	--
Pacific hake	315.95	32.78	348.73	22.07	282.02	304.09	--	--	--	0.01	--	0.01
Pacific ocean perch (North of 40°10' N. lat.)	0.58	46.10	46.68	0.00	0.21	0.21	--	0.01	0.01	--	0.01	0.01
Petrale sole	13.51	2,718.20	2,731.71	--	0.19	0.19	0.00	0.01	0.02	0.05	0.04	0.10
Sablefish (North of 36° N. lat.)	21.44	1,517.28	1,538.72	0.02	0.40	0.42	0.37	95.18	95.55	2.10	752.54	754.64
Sablefish (South of 36° N. lat.)	0.05	0.96	1.00	--	--	--	--	--	--	0.37	110.00	110.37
Shortbelly rockfish	0.11	0.46	0.58	0.00	3.64	3.64	--	--	--	--	--	--
Shortspine thornyhead (North of 34°27' N. lat.)	4.34	731.98	736.32	0.00	0.03	0.03	0.02	5.44	5.46	0.27	0.91	1.18
Spiny dogfish	144.21	2.72	146.92	0.04	0.13	0.17	6.74	--	6.74	0.18	0.00	0.18
Splitnose rockfish (South of 40°10' N. lat.)	2.49	10.05	12.54	--	--	--	--	--	--	--	--	--
Starry flounder	0.34	9.22	9.56	--	0.00	0.00	--	--	--	--	--	--
Widow rockfish	0.28	33.61	33.89	9.75	4,847.52	4,857.27	--	--	--	--	--	--

**Table 3a (continued).**

Weight (mt)	IFQ - Bottom Trawl			IFQ - Midwater Rockfish Trawl			IFQ - Hook-and-Line			IFQ - Pot		
	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate
YELLOWEYE ROCKFISH	0.01	0.14	0.14	--	0.00	0.00	--	0.01	0.01	--	0.00	0.00
Yellowtail rockfish (North of 40°10' N. lat.)	0.52	199.22	199.74	0.83	952.88	953.70	0.00	0.16	0.16	--	--	--
<b>Non-groundfish species</b>												
Dungeness crab	171.94	0.02	171.96	0.10	0.00	0.10	0.00	--	0.00	1.36	--	1.36
Non-FMP flatfish												
Deepsea Sole	5.82	0.01	5.82	--	--	--	--	--	--	0.00	--	0.00
Slender Sole	61.33	0.11	61.44	0.00	--	0.00	--	--	--	--	--	--
Other nongroundfish												
Sculpin Unid	0.76	0.00	0.76	0.00	--	0.00	--	--	--	--	--	--
Skate Unid	0.83	17.84	18.68	--	0.01	0.01	--	0.01	0.01	--	0.00	0.00
Squid Unid	0.30	1.27	1.57	0.00	0.05	0.05	--	--	--	--	--	--
Starry Skate	0.09	0.00	0.09	--	--	--	--	--	--	--	--	--
Shared ecosystem component species												
Bristlemouth Unid	0.00	--	0.00	--	--	--	--	--	--	--	--	--
Deepsea Smelt Unid	0.00	--	0.00	--	--	--	--	--	--	--	--	--
Lanternfish Unid	0.00	--	0.00	--	--	--	--	--	--	--	--	--
Lightfish Unid	0.00	--	0.00	--	--	--	--	--	--	--	--	--
Non-Eulachon Smelt Unid	0.01	--	0.01	--	--	--	--	--	--	--	--	--
Non-Humboldt Squid Unid	11.75	--	11.75	0.09	--	0.09	--	--	--	0.00	--	0.00
Pacific Saury	0.00	--	0.00	--	--	--	--	--	--	--	--	--
Smelt Unid	--	--	--	--	--	--	--	--	--	--	2.16	2.16

**Table 3b. Observed Sectors: Hake IFQ/Co-op Fishing Mortality Estimates by Sector.**

Retained catch/landings (mt), discard (mt), and fishing mortality estimates (mt) of groundfish species from hake IFQ/Co-op sectors. Observed discard in the shoreside midwater hake sector was combined with at-sea discard recorded by EM, along with total landings from PacFIN. The summary of the at-sea hake Co-op Program was derived from A-SHOP data.

Groundfish species	Weight (mt)	IFQ - Midwater Hake			At-sea Catcher-Processors			At-sea Mothership Catcher Vessels		
		Discard	Landed	Estimate	Discard	Retained	Estimate	Discard	Retained	Estimate
Arrowtooth flounder	0.05		6.80	6.85	3.79	10.06	13.86	0.12	3.53	3.65
Big skate	0.01		1.33	1.34	1.58	0.56	2.14	0.57	0.07	0.64
Black rockfish (Washington)	--		0.00	0.00	--	--	--	--	--	--
Canary rockfish	0.55		73.72	74.27	0.96	1.10	2.06	0.21	4.29	4.50
Darkblotched rockfish	0.46		32.56	33.02	6.75	25.26	32.00	3.17	4.47	7.64
Dover sole	0.00		0.01	0.01	0.04	0.33	0.36	0.00	0.10	0.11
Ecosystem component species										
Aleutian Skate	--	--	--	--	--	0.00	0.00	0.00	--	0.00
California Skate	--	--	--	--	0.00	--	0.00	0.02	--	0.02
Grenadier Unid	--	--	--	--	0.23	0.78	1.01	0.09	--	0.09
Pacific Flatnose	--	--	--	--	0.00	--	0.00	--	--	--
Sandpaper Skate	--	--	--	--	0.00	0.00	0.00	--	--	--
Soupin Shark	0.00		0.54	0.54	0.89	0.09	0.97	0.74	0.17	0.91
Spotted Ratfish	--	--	--	--	0.00	0.00	0.00	--	--	--
English sole	0.00		0.01	0.01	0.01	0.03	0.04	0.00	0.01	0.01
Groundfish unid	0.00		0.19	0.19	--	--	--	--	--	--
Lingcod (North of 40°10' N. lat.)	0.13		7.78	7.91	0.05	0.08	0.13	0.05	0.80	0.85
Longnose skate	0.00		0.42	0.42	0.33	0.12	0.45	0.50	0.02	0.52
Longspine thornyhead (North of 34°27' N. lat.)	0.00		0.00	0.00	0.00	--	0.00	--	--	--
Minor nearshore rockfish (North of 40°10' N. lat.)										
Blue/Deacon Rockfish	0.00		0.00	0.00	--	--	--	--	--	--
Nearshore Rockfish Unid	--		0.00	0.00	--	--	--	--	--	--
Minor shelf rockfish (North of 40°10' N. lat.)										
Bocaccio Rockfish	0.04		4.73	4.77	0.20	0.17	0.38	0.03	0.32	0.35
Chilipepper Rockfish	0.20		51.02	51.22	0.64	0.65	1.29	0.13	11.19	11.32
Greenstriped Rockfish	0.00		0.10	0.10	--	--	--	--	--	--
Harlequin Rockfish	0.00		0.08	0.08	0.00	0.00	0.01	0.00	0.01	0.01
Redstripe Rockfish	0.08		15.91	15.99	0.53	0.24	0.77	0.03	0.17	0.20
Rosethorn Rockfish	--	--	--	--	--	0.00	0.00	--	--	--
Shelf Rockfish Unid	0.00		0.02	0.02	--	--	--	--	--	--
Silvergray Rockfish	0.02		4.15	4.17	0.42	0.35	0.77	0.16	0.25	0.41
Stripetail Rockfish	--	--	--	--	0.00	--	0.00	0.00	0.00	0.00
Minor slope rockfish (North of 40°10' N. lat.)										
Aurora Rockfish	0.01		0.38	0.38	0.01	0.00	0.01	--	--	--
Bank Rockfish	--	--	--	--	0.02	0.04	0.05	0.00	0.00	0.01
Blackgill Rockfish	--	--	--	--	0.00	--	0.00	0.00	0.01	0.01
Redbanded Rockfish	--	--	--	--	0.00	0.02	0.03	0.02	0.00	0.03
Rougheye/Blackspotted Rockfish	0.01		2.48	2.49	11.77	22.11	33.87	0.63	3.64	4.27
Sharpchin Rockfish	0.01		3.14	3.15	0.01	0.02	0.03	0.00	0.00	0.00
Shortraker Rockfish	0.00		0.07	0.07	0.01	0.02	0.03	--	0.00	0.00
Slope Rockfish Unid	0.00		5.46	5.47	--	--	--	--	--	--
Splitnose Rockfish	0.04		36.98	37.02	12.93	49.62	62.55	4.27	18.40	22.67
Yellowmouth Rockfish	0.00		0.04	0.04	0.01	0.37	0.38	--	0.00	0.00
Other flatfish										
Flatfish Unid	0.00		0.01	0.01	0.00	0.00	0.00	--	0.00	0.00
Flathead Sole	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
Pacific Sanddab	--		0.00	0.00	--	--	--	0.00	0.00	0.00
Rex Sole	0.00		0.05	0.05	1.80	5.54	7.34	0.07	1.05	1.12
Rock Sole	0.00		0.00	0.00	--	--	--	--	--	--
Other rockfish										
Rockfish Unid	0.01		--	0.01	--	--	--	--	--	--
Pacific cod	0.01		0.70	0.71	0.00	0.01	0.01	0.00	0.18	0.18
Pacific hake	1,789.52	144,126.01	145,915.53	25.26	137,104.45	137,129.71	898.57	65,358.46	66,257.03	
Pacific ocean perch (North of 40°10' N. lat.)	0.37		47.07	47.44	5.16	15.17	20.33	0.51	5.42	5.93
Petrable sole	0.00		0.04	0.04	--	0.00	0.00	--	--	--
Roundfish unid	0.02		--	0.02	0.31	0.28	0.59	--	--	--
Sablefish (North of 36° N. lat.)	1.47		97.04	98.51	33.61	33.87	67.48	16.43	69.35	85.79
Shortbelly rockfish	0.66		124.65	125.31	8.06	132.75	140.81	10.50	17.23	27.73
Shortspine thornyhead (North of 34°27' N. lat.)	0.01		1.05	1.06	4.99	19.80	24.79	1.54	1.63	3.18
Spiny dogfish	1.44		100.22	101.66	10.59	97.60	108.19	24.96	6.75	31.70
Widow rockfish	3.65		969.50	973.15	113.86	296.02	409.88	14.66	51.44	66.11
YELLOW EYE ROCKFISH	0.00		0.00	0.00	--	--	--	0.00	--	0.00
Yellowtail rockfish (North of 40°10' N. lat.)	8.63	1,296.46	1,305.09	33.98	96.24	130.22	37.89	110.03	147.93	

**Table 3b (continued).**

Weight (mt)	IFQ - Midwater Hake			At-sea Catcher-Processors			At-sea Mothership Catcher Vessels		
	Discard	Landed	Estimate	Discard	Retained	Estimate	Discard	Retained	Estimate
<b>Non-groundfish species</b>									
Dungeness crab	0.00	0.00	0.00	--	--	--	--	--	--
Non-FMP flatfish									
Slender Sole	--	--	--	0.00	0.00	0.00	0.00	0.00	0.00
Other nongroundfish									
Skate Unid	0.00	0.12	0.12	--	--	--	--	--	--
Squid Unid	0.16	17.87	18.03	107.76	63.11	170.87	20.40	7.84	28.24
Shared ecosystem component species									
Blacksmelt Unid	--	--	--	0.00	--	0.00	--	--	--
Deepsea Smelt Unid	--	--	--	0.01	0.03	0.04	0.00	--	0.00
Duckbill Barracudina	--	--	--	0.37	0.32	0.69	0.02	0.00	0.02
Lanternfish Unid	--	--	--	0.20	0.27	0.47	0.00	0.00	0.00
Non-Humboldt Squid Unid	0.07	--	0.07	--	--	--	--	--	--
Pacific Saury	--	--	--	0.00	0.00	0.00	0.00	0.00	0.00
Slender Barracudina	--	--	--	0.00	0.00	0.00	--	--	--
White Barracudina	--	--	--	0.01	0.00	0.02	0.00	--	0.00

**Table 4a. OA California Halibut Trawl.**

Observed discard ratios, SE, CV, estimated discard (mt), landings (mt), and fishing mortality estimates (mt) of groundfish species in the OA California halibut fishery (which only occurs south of 40°10' N. latitude). Ratios are computed as the observed discard weight divided by the observed weight of retained California halibut (adjusted to fish tickets). Discard ratios were multiplied by fleet landings of California halibut to generate estimated discard.

Open Access California Halibut Fishery South of 40°10' N Lat.	Observed vessels		Observed trips	Observed tows	Expansion factor: Fleet landings of California halibut (mt)	
	13		129	555	96	
	Discard Ratio	SE	CV	Discard	Landed	Total Estimate
<b>Groundfish species</b>						
Big skate	0.3745	0.0434	0.1159	36.11	1.92	19.98
50% discard mortality (Trawl)‡				18.06		
Cabazon (California)	0.0001	0.0000	0.2519	0.01	--	0.01
California scorpionfish (South of 34°27' N. lat.)	0.0041	0.0008	0.1820	0.40	--	0.40
Canary rockfish	0.0001	0.0000	0.1224	0.01	--	0.01
Chilipepper rockfish (South of 40°10' N. lat.)	0.0001	0.0000	0.6274	0.01	--	0.01
Dover sole	0.0000	0.0000	0.3705	0.00	0.00	0.00
Ecosystem component species						
California Skate	0.2069	0.0247	0.1193	19.95	0.14	20.08
Sandpaper Skate	0.0000	0.0000	0.0908	0.00	--	0.00
Soupin Shark	0.0093	0.0020	0.2161	0.90	0.03	0.93
Spotted Ratfish	0.0001	0.0000	0.2589	0.01	--	0.01
English sole	0.0251	0.0030	0.1180	2.42	0.07	2.49
Lingcod (South of 40°10' N. lat.)	0.0100	0.0021	0.2055	0.97	0.60	1.09
50% discard mortality (Trawl)‡				0.48		
Longnose skate	0.0045	0.0007	0.1605	0.43	--	0.22
50% discard mortality (Trawl)‡				0.22		
Minor nearshore rockfish (South of 40°10' N. lat.)						
Brown Rockfish	0.0019	0.0006	0.3043	0.18	0.00	0.18
Calico Rockfish	0.0001	0.0000	0.3552	0.01	--	0.01
Copper Rockfish	0.0001	0.0001	0.6998	0.01	0.00	0.01
Quillback Rockfish	0.0000	0.0000	0.0908	0.00	--	0.00
Minor shelf rockfish (South of 40°10' N. lat.)						
Bronzespotted Rockfish	0.0000	0.0000	0.5793	0.00	--	0.00
Greenspotted Rockfish	--	--	--	--	0.00	0.00
Halfbanded Rockfish	0.0000	0.0000	0.1001	0.00	--	0.00
Mexican Rockfish	0.0000	0.0000	0.4641	0.00	--	0.00
Rosy Rockfish	0.0000	0.0000	0.0908	0.00	--	0.00
Stripetail Rockfish	0.0000	0.0000	0.1001	0.00	--	0.00
Vermilion Rockfish	0.0001	0.0000	0.2879	0.01	0.00	0.02
Yellowtail Rockfish	0.0001	0.0001	0.6701	0.01	--	0.01
Other flatfish						
Cutfin Sole	0.0162	0.0020	0.1256	1.56	0.51	2.07
Flatfish Unid	0.0002	0.0001	0.6186	0.02	0.13	0.15
Pacific Sanddab	0.0121	0.0018	0.1529	1.16	0.04	1.20
Rex Sole	0.0003	0.0001	0.2129	0.03	--	0.03
Rock Sole	0.0003	0.0000	0.1528	0.03	0.19	0.22
Sand Sole	0.0070	0.0013	0.1824	0.68	4.75	5.43
Sanddab Unid	--	--	--	--	0.00	0.00
Other groundfish						
Kelp Greenling (California)	0.0000	0.0000	0.4451	0.00	--	0.00
Leopard Shark	0.0575	0.0090	0.1558	5.54	--	5.54
Pacific hake	0.0000	0.0000	0.2084	0.00	--	0.00
Petrale sole	0.0053	0.0011	0.2060	0.51	2.64	3.15
Spiny dogfish	0.0577	0.0090	0.1558	5.56	--	5.56
Starry flounder	0.0107	0.0023	0.2161	1.03	3.53	4.56
<b>Non-groundfish species</b>						
California halibut	0.2075	0.0267	0.1287	20.01	96.43	116.44
Dungeness crab	1.1878	0.1372	0.1155	114.54	--	114.54
Non-FMP flatfish						
Diamond Turbot	0.0004	0.0001	0.2230	0.04	--	0.04
Hornyhead Turbot	0.0142	0.0016	0.1129	1.37	0.00	1.37
Longfin Sanddab	0.0026	0.0003	0.1318	0.25	--	0.25
Slender Sole	0.0000	0.0000	0.0908	0.00	0.07	0.07
Speckled Sanddab	0.0000	0.0000	0.3339	0.00	--	0.00
Other nongroundfish						
Sculpin Unid	0.0005	0.0001	0.1545	0.05	--	0.05
Skate Unid	0.0000	0.0000	0.0908	0.00	0.40	0.41
Starry Skate	0.0030	0.0005	0.1801	0.29	0.00	0.29
Shared ecosystem component species						
Non-Humboldt Squid Unid	0.0003	0.0001	0.3048	0.03	--	0.03
Pacific Sandlance	0.0000	0.0000	0.0908	0.00	--	0.00

‡Mortality rates provided by the Groundfish Management Team (GMT).



**Table 4b. Sea Cucumber Trawl.**

Observed discard ratios, SE, CV, estimated discard (mt), landings (mt), and fishing mortality estimates (mt) of groundfish species in the sea cucumber fishery. Ratios are computed as the observed discard weight divided by the observed weight of retained sea cucumber (adjusted to fish tickets). Discard ratios were multiplied by fleet landings of sea cucumber to generate estimated discard.

Sea Cucumber Fishery	Observed vessels		Observed trips	Observed tows	Expansion factor: Fleet landings of sea cucumber (mt)	
	3		19	51	14	
	Discard Ratio	SE	CV	Discard	Landed	Total Estimate
<b>Groundfish species</b>						
Big skate	0.0046	0.0004	0.0803	0.06	—	0.06
Bocaccio rockfish (South of 40°10' N. lat.)	0.0004	0.0001	0.1968	0.00	—	0.00
California scorpionfish (South of 34°27' N. lat.)	0.0115	0.0022	0.1924	0.16	—	0.16
Chilipepper rockfish (South of 40°10' N. lat.)	0.0005	0.0002	0.4323	0.01	—	0.01
Darkblotched rockfish	0.0001	0.0000	0.3517	0.00	—	0.00
Dover sole	0.0038	0.0008	0.2055	0.05	0.00	0.05
Ecosystem component species						
California Skate	0.1141	0.0177	0.1553	1.58	—	1.58
English sole	0.0980	0.0170	0.1730	1.35	0.02	1.38
Lingcod (South of 40°10' N. lat.)	0.0031	0.0007	0.2169	0.04	—	0.04
Longnose skate	0.0015	0.0001	0.0803	0.02	—	0.02
Minor nearshore rockfish (South of 40°10' N. lat.)						
Brown Rockfish	—	—	—	—	0.00	0.00
Calico Rockfish	0.0037	0.0006	0.1740	0.05	—	0.05
Copper Rockfish	0.0079	0.0019	0.2344	0.11	0.01	0.12
Minor shelf rockfish (South of 40°10' N. lat.)						
Freckled Rockfish	0.0000	0.0000	0.0803	0.00	—	0.00
Greenspotted Rockfish	0.0005	0.0002	0.3483	0.01	0.00	0.01
Halfbanded Rockfish	0.0463	0.0157	0.3401	0.64	—	0.64
Rosethorn Rockfish	0.0002	0.0001	0.2634	0.00	—	0.00
Squarespot Rockfish	0.0017	0.0007	0.4213	0.02	—	0.02
Starry Rockfish	0.0001	0.0000	0.0803	0.00	—	0.00
Stripetail Rockfish	0.0045	0.0009	0.2019	0.06	—	0.06
Vermilion Rockfish	0.0025	0.0008	0.3071	0.03	0.00	0.04
Other flatfish						
Curlfin Sole	0.0010	0.0003	0.3288	0.01	—	0.01
Flatfish Unid	0.0002	0.0000	0.0803	0.00	0.01	0.01
Pacific Sanddab	0.0145	0.0029	0.1981	0.20	0.00	0.20
Sanddab Unid	—	—	—	—	0.00	0.00
Petrale sole	0.0005	0.0001	0.1609	0.01	0.00	0.01
Shortbelly rockfish	0.0000	0.0000	0.0803	0.00	—	0.00
Spiny dogfish	0.0124	0.0023	0.1838	0.17	—	0.17
<b>Non-groundfish species</b>						
Non-FMP flatfish						
Hornyhead Turbot	0.0118	0.0024	0.1985	0.16	0.00	0.16
Longfin Sanddab	0.0106	0.0020	0.1903	0.15	—	0.15
Other nongroundfish						
Sculpin Unid	0.0061	0.0011	0.1850	0.08	—	0.08
Shared ecosystem component species						
Non-Humboldt Squid Unid	0.0000	0.0000	0.0803	0.00	—	0.00

**Table 5a. Pink Shrimp Trawl.**

Observed discard ratios, SEs, CVs, estimated discard (mt), landings (mt), and fishing mortality estimates (mt) of groundfish species from state pink shrimp fisheries. Ratios are computed as the observed discard weight divided by the observed weight of retained pink shrimp (adjusted to fish tickets). Discard ratios were multiplied by state fleet landings of pink shrimp to generate estimated discard.

Pink Shrimp Trawl Fishery: <input type="checkbox"/>	Washington							Oregon							California						
	Weight (mt)	Observed vessels		Observed trips	Observed tows	Expansion factor: Fleet landings of pink shrimp (mt)		Observed vessels		Observed trips	Observed tows	Expansion factor: Fleet landings of pink shrimp (mt)		Observed vessels		Observed trips	Observed tows	Expansion factor: Fleet landings of pink shrimp (mt)			
		16		48	847	3,041		45		112	1466	10,459		11		18	230	1,484			
		Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard Ratio	SE	CV	Discard	Landed	Estimate		
Groundfish species																					
Arrowtooth flounder	0.0001	0.0000	0.1899	0.27	--	0.27	0.0001	0.0000	0.0974	0.73	--	0.73	0.0001	0.0000	0.2119	0.13	--	0.13			
Big skate	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.0708	0.00	--	0.00			
Bocaccio rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--	0.0001	0.0000	0.2455	0.12	--	0.12			
Canary rockfish	--	--	--	--	--	--	0.0000	0.0000	0.8426	0.07	--	0.07	0.0000	0.0000	0.0708	0.00	--	0.00			
Chillipepper rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--	0.0007	0.0001	0.1722	1.07	--	1.07			
COWCOD ROCKFISH (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--	0.0001	0.0000	0.6704	0.09	--	0.09			
Darkblotched rockfish	0.0012	0.0001	0.0558	3.63	--	3.63	0.0002	0.0000	0.0777	2.37	--	2.37	0.0000	0.0000	0.1744	0.05	--	0.05			
Dover sole	0.0001	0.0000	0.2182	0.39	--	0.39	0.0002	0.0000	0.1126	2.47	--	2.47	0.0011	0.0003	0.2620	1.70	--	1.70			
Ecosystem component species																					
Aleutian Skate	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.2546	0.00	--	0.00			
California Skate	0.0000	0.0000	0.0277	0.00	--	0.00	0.0000	0.0000	0.2203	0.03	--	0.03	0.0000	0.0000	0.3042	0.00	--	0.00			
Pacific Flatnose	--	--	--	--	--	--	0.0000	0.0000	0.0269	0.00	--	0.00	--	--	--	--	--	--			
Sandpaper Skate	0.0000	0.0000	0.6728	0.00	--	0.00	0.0000	0.0000	0.1293	0.05	--	0.05	0.0000	0.0000	0.0965	0.00	--	0.00			
Soupin Shark	0.0000	0.0000	0.0277	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--			
Spotted Ratfish	0.0000	0.0000	0.5640	0.03	--	0.03	0.0000	0.0000	0.1312	0.06	--	0.06	0.0000	0.0000	0.2056	0.07	--	0.07			
English sole	0.0000	0.0000	0.0277	0.00	--	0.00	0.0000	0.0000	0.2423	0.02	--	0.02	0.0000	0.0000	0.5347	0.02	--	0.02			
Lingcod (North of 40°10' N. lat.)	--	--	--	--	--	--	0.0000	0.0000	0.3565	0.01	--	0.01	0.0000	0.0000	0.1523	0.00	--	0.00			
Longnose skate	0.0000	0.0000	0.4356	0.02	--	0.02	0.0000	0.0000	0.3595	0.39	--	0.39	0.0001	0.0000	0.2860	0.07	--	0.07			
Longspine thornyhead (North of 34°27' N. lat.)	--	--	--	--	--	--	0.0000	0.0000	0.1254	0.00	--	0.00	--	--	--	--	--	--			
Minor nearshore rockfish (North of 40°10' N. lat.)	--	--	--	--	--	--	0.0000	0.0000	0.0269	0.00	--	0.00	--	--	--	--	--	--			
Blue/Deacon Rockfish	--	--	--	--	--	--	0.0000	0.0000	0.0269	0.00	--	0.00	--	--	--	--	--	--			
Minor nearshore rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
Nearshore Rockfish Unid	--	--	--	--	--	--	--	--	--	--	--	--	0.0002	0.0000	0.0708	0.28	--	0.28			
Minor shelf rockfish (North of 40°10' N. lat.)																					
Bocaccio Rockfish	0.0000	0.0000	0.0277	0.00	--	0.00	0.0000	0.0000	0.2765	0.00	--	0.00	--	--	--	--	--	--			
Chillipepper Rockfish	0.0001	0.0000	0.3534	0.18	--	0.18	0.0001	0.0000	0.2144	1.12	--	1.12	0.0001	0.0000	0.3081	0.19	--	0.19			
Cowcod Rockfish	--	--	--	--	--	--	0.0000	0.0000	0.2122	0.01	--	0.01	0.0000	0.0000	0.4659	0.00	--	0.00			
Greenstriped Rockfish	0.0000	0.0000	0.1751	0.05	--	0.05	0.0001	0.0000	0.0996	0.58	--	0.58	0.0000	0.0000	0.1536	0.05	--	0.05			
Halfbanded Rockfish	--	--	--	--	--	--	0.0000	0.0000	0.2072	0.01	--	0.01	0.0000	0.0000	0.3741	0.00	--	0.00			
Puget Sound Rockfish	--	--	--	--	--	--	0.0000	0.0000	0.0269	0.00	--	0.00	--	--	--	--	--	--			
Pygmy Rockfish	0.0000	0.0000	0.0277	0.00	--	0.00	0.0000	0.0000	0.6072	0.17	--	0.17	--	--	--	--	--	--			
Redstripe Rockfish	0.0000	0.0000	0.3747	0.00	--	0.00	0.0000	0.0000	0.1730	0.16	--	0.16	--	--	--	--	--	--			
Rosethorn Rockfish	0.0000	0.0000	0.0277	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--			
Shelf Rockfish Unid	0.0002	0.0002	0.7286	0.64	--	0.64	0.0001	0.0001	0.3847	1.46	--	1.46	0.0000	0.0000	0.7992	0.05	--	0.05			
Squarespot Rockfish	--	--	--	--	--	--	0.0000	0.0000	0.0269	0.00	--	0.00	--	--	--	--	--	--			
Stripetail Rockfish	0.0000	0.0000	0.2041	0.09	--	0.09	0.0003	0.0000	0.0974	3.05	--	3.05	0.0002	0.0001	0.2974	0.30	--	0.30			
Tiger Rockfish	--	--	--	--	--	--	0.0000	0.0000	0.4729	0.00	--	0.00	--	--	--	--	--	--			
Vermilion Rockfish	--	--	--	--	--	--	0.0000	0.0000	0.0269	0.00	--	0.00	--	--	--	--	--	--			
Minor shelf rockfish (South of 40°10' N. lat.)																					
Halfbanded Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.2797	0.01	--	0.01			
Redstripe Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.0708	0.01	--	0.01			
Shelf Rockfish Unid	--	--	--	--	--	--	--	--	--	--	--	--	0.0004	0.0003	0.6532	0.58	--	0.58			
Spotted Rockfish Unid	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.0708	0.00	--	0.00			
Squarespot Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.4289	0.02	--	0.02			
Stripetail Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.0029	0.0006	0.1943	4.36	--	4.36			
Minor slope rockfish (North of 40°10' N. lat.)																					
Aurora Rockfish	0.0000	0.0000	0.1399	0.00	--	0.00	0.0000	0.0000	0.0269	0.01	--	0.01	--	--	--	--	--	--			
Redbanded Rockfish	0.0000	0.0000	0.6078	0.01	--	0.01	0.0000	0.0000	0.7285	0.13	--	0.13	--	--	--	--	--	--			
Rougheye/Blackspotted Rockfish	--	--	--	--	--	--	0.0000	0.0000	0.0269	0.01	--	0.01	--	--	--	--	--	--			
Sharpchin Rockfish	--	--	--	--	--	--	0.0000	0.0000	0.1167	0.26	--	0.26	--	--	--	--	--	--			
Splitnose Rockfish	0.0000	0.0000	0.2466	0.04	--	0.04	0.0001	0.0000	0.1336	0.83	--	0.83	0.0000	0.0000	0.5863	0.00	--	0.00			
Minor slope rockfish (South of 40°10' N. lat.)																					
Aurora Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.0003	0.0001	0.2331	0.38	--	0.38			

Table 5a (continued).

Pink Shrimp Trawl Fishery	Washington						Oregon						California					
				Expansion factor:						Expansion factor:						Expansion factor:		
	Observed vessels	Observed trips	Observed tows	Fleet landings of pink shrimp (mt)			Observed vessels	Observed trips	Observed tows	Fleet landings of pink shrimp (mt)			Observed vessels	Observed trips	Observed tows	Fleet landings of pink shrimp (mt)		
	16	48	847	3,041			45	112	1466	10,459			11	18	230	1,484		
Weight (mt)	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard Ratio	SE	CV	Discard	Landed	Estimate
Other flatfish																		
Flatfish Unid	0.0000	0.0000	0.0277	0.02	--	0.02	0.0001	0.0000	0.3770	0.55	--	0.55	0.0010	0.0005	0.4923	1.54	--	1.54
Flathead Sole	0.0001	0.0000	0.2083	0.33	--	0.33	0.0000	0.0000	0.1569	0.31	--	0.31	--	--	--	--	--	--
Pacific Sanddab	0.0001	0.0000	0.2450	0.19	--	0.19	0.0001	0.0000	0.0935	1.47	--	1.47	0.0007	0.0002	0.2652	1.01	--	1.01
Rex Sole	0.0025	0.0002	0.0767	7.50	--	7.50	0.0018	0.0001	0.0715	18.74	--	18.74	0.0033	0.0009	0.2676	4.84	--	4.84
Rock Sole	0.0000	0.0000	0.0277	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Pacific cod	0.0000	0.0000	0.3869	0.01	--	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Pacific hake	0.0518	0.0069	0.1327	157.38	--	157.38	0.0132	0.0019	0.1406	137.89	--	137.89	0.0539	0.0096	0.1785	79.97	--	79.97
Pacific ocean perch (North of 40°10' N. lat.)	0.0001	0.0000	0.1509	0.19	--	0.19	0.0000	0.0000	0.1466	0.04	--	0.04	0.0000	0.0000	0.3286	0.00	--	0.00
Petrale sole	0.0001	0.0000	0.1781	0.20	--	0.20	0.0000	0.0000	0.1560	0.07	--	0.07	0.0000	0.0000	0.3912	0.03	--	0.03
Roundfish unid	--	--	--	--	--	--	0.0000	0.0000	0.0269	0.00	--	0.00	--	--	--	--	--	--
Sablefish (North of 36° N. lat.)	0.0000	0.0000	0.5426	0.00	--	0.00	0.0000	0.0000	0.3295	0.08	--	0.08	0.0001	0.0000	0.1912	0.11	--	0.11
Sablefish (South of 36° N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.3664	0.01	--	0.01
Shortbelly rockfish	0.0017	0.0002	0.1249	5.05	--	5.05	0.0014	0.0001	0.0980	14.22	--	14.22	0.0015	0.0003	0.1796	2.23	--	2.23
Shortspine thornyhead (North of 34°27' N. lat.)	--	--	--	--	--	--	0.0000	0.0000	0.3826	0.03	--	0.03	0.0000	0.0000	0.3464	0.01	--	0.01
Spiny dogfish	--	--	--	--	--	--	0.0000	0.0000	0.3691	0.01	--	0.01	0.0000	0.0000	0.3626	0.00	--	0.00
Splitnose rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--	0.0019	0.0010	0.5055	2.88	--	2.88
Widow rockfish	0.0000	0.0000	0.0277	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
YELLOWEYE ROCKFISH	--	--	--	--	--	--	0.0000	0.0000	0.0375	0.00	--	0.00	--	--	--	--	--	--
Yellowtail rockfish (North of 40°10' N. lat.)	0.0000	0.0000	0.1704	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Non-groundfish species																		
Dungeness crab	--	--	--	--	--	--	0.0000	0.0000	0.0269	0.00	--	0.00	0.0000	0.0000	0.0708	0.00	--	0.00
Non-FMP flatfish																		
Deepsea Sole	--	--	--	--	--	--	0.0000	0.0000	0.0269	0.11	--	0.11	--	--	--	--	--	--
Longfin Sanddab	0.0000	0.0000	0.0441	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Slender Sole	0.0021	0.0002	0.0991	6.31	--	6.31	0.0053	0.0004	0.0730	55.06	--	55.06	0.0068	0.0014	0.2118	10.08	--	10.08
Other nongroundfish																		
Sculpin Unid	--	--	--	--	--	--	0.0000	0.0000	0.1108	0.15	--	0.15	0.0000	0.0000	0.5226	0.04	--	0.04
Skate Unid	0.0000	0.0000	0.0277	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Shared ecosystem component species																		
Barracudina Unid	--	--	--	--	--	--	0.0000	0.0000	0.0269	0.00	--	0.00	--	--	--	--	--	--
Lanternfish Unid	0.0000	0.0000	0.4266	0.00	--	0.00	0.0000	0.0000	0.0815	0.02	--	0.02	0.0000	0.0000	0.2750	0.00	--	0.00
Non-Eulachon Smelt Unid	0.0003	0.0000	0.1501	0.85	--	0.85	0.0000	0.0000	0.2777	0.15	--	0.15	0.0000	0.0000	0.3465	0.05	--	0.05
Non-Humboldt Squid Unid	0.0001	0.0000	0.0920	0.42	--	0.42	0.0004	0.0001	0.1448	3.98	--	3.98	0.0011	0.0002	0.1450	1.67	--	1.67
Pacific Saury	--	--	--	--	--	--	0.0000	0.0000	0.0269	0.00	--	0.00	--	--	--	--	--	--

**Table 5b. Ridgeback Prawn Trawl.**

Observed discard ratios, SE, CV, estimated discard (mt), landings (mt), and fishing mortality estimates (mt) of groundfish species in the ridgeback prawn fishery. Ratios are computed as the observed discard weight divided by the observed weight of retained ridgeback prawn (adjusted to fish tickets). Discard ratios were multiplied by fleet landings of ridgeback prawn to generate estimated discard.

Ridgeback Prawn Fishery	Expansion factor:					
	Observed vessels		Observed trips	Observed tows	Fleet landings of ridgeback prawn (mt)	
	9	63	292	161		
Weight (mt)	Discard Ratio	SE	CV	Discard	Landed	Total Estimate
<b>Groundfish species</b>						
Arrowtooth flounder	0.0001	0.0000	0.0378	0.01	--	0.01
Big skate	0.0000	0.0000	0.0378	0.00	--	0.00
Black rockfish (California)	--	--	--	--	0.00	0.00
Bocaccio rockfish (South of 40°10' N. lat.)	0.0009	0.0002	0.2138	0.15	0.00	0.15
Cabezon (California)	0.0001	0.0000	0.0378	0.01	0.00	0.02
California scorpionfish (South of 34°27' N. lat.)	0.0048	0.0031	0.6426	0.77	0.14	0.92
Canary rockfish	0.0001	0.0000	0.0378	0.01	--	0.01
Chilipepper rockfish (South of 40°10' N. lat.)	0.0040	0.0008	0.1945	0.65	--	0.65
COWCOD ROCKFISH (South of 40°10' N. lat.)	0.0004	0.0001	0.3391	0.07	--	0.07
Darkblotched rockfish	0.0001	0.0000	0.3096	0.01	--	0.01
Dover sole	0.0654	0.0075	0.1141	10.52	0.01	10.52
Ecosystem component species						
California Skate	0.0068	0.0013	0.1962	1.09	--	1.09
Southern Shark	0.0003	0.0000	0.0378	0.04	--	0.04
Spotted Ratfish	0.0046	0.0008	0.1708	0.73	--	0.73
English sole	0.1369	0.0139	0.1018	22.00	0.80	22.80
Lingcod (South of 40°10' N. lat.)	0.0022	0.0004	0.1670	0.35	0.05	0.40
Longnose skate	0.0024	0.0005	0.2299	0.38	0.01	0.39
Minor nearshore rockfish (South of 40°10' N. lat.)						
Brown Rockfish	0.0001	0.0000	0.3232	0.01	0.00	0.02
Calico Rockfish	0.0006	0.0001	0.1577	0.10	--	0.10
Copper Rockfish	0.0001	0.0001	0.5631	0.02	--	0.02
Kelp Rockfish	0.0000	0.0000	0.0378	0.00	--	0.00
Minor shelf rockfish (South of 40°10' N. lat.)						
Flag Rockfish	0.0000	0.0000	0.0378	0.01	--	0.01
Freckled Rockfish	0.0001	0.0000	0.1852	0.02	--	0.02
Greenblotched Rockfish	0.0005	0.0003	0.6710	0.08	--	0.08
Greenspotted Rockfish	0.0001	0.0001	0.5156	0.02	--	0.02
Greenstriped Rockfish	0.0003	0.0001	0.1721	0.05	--	0.05
Halfbanded Rockfish	0.0258	0.0046	0.1804	4.14	--	4.14
Mexican Rockfish	0.0001	0.0001	0.4140	0.02	--	0.02
Redstripe Rockfish	0.00	0.00	0.1614	0.01	--	0.01
Rosy Rockfish	0.0000	0.0000	0.0378	0.00	--	0.00
Shelf Rockfish Unid	0.0039	0.0015	0.3870	0.63	0.04	0.67
Speckled Rockfish	0.0000	0.0000	0.4084	0.00	--	0.00
Squarespot Rockfish	0.0003	0.0001	0.3097	0.05	--	0.05
Striptail Rockfish	0.0306	0.0036	0.1156	4.96	--	4.96
Swordspine Rockfish	0.0000	0.0000	0.0378	0.00	--	0.00
Vermilion Rockfish	0.0035	0.0023	0.6665	0.56	0.01	0.57
Minor slope rockfish (South of 40°10' N. lat.)						
Aurora Rockfish	0.0003	0.0000	0.0378	0.06	--	0.06
Bank Rockfish	0.0000	0.0000	0.0378	0.00	--	0.00
Slope Rockfish Unid	0.0001	0.0000	0.0378	0.01	0.04	0.05
Mixed thornyheads						
Shortspine/Longspine Thornyhead	--	--	--	--	0.01	0.01
Other flatfish						
Cutlin Sole	0.0004	0.0001	0.2530	0.06	0.00	0.07
Flatfish Unid	0.0117	0.0029	0.2486	1.88	1.04	2.92
Pacific Sanddab	0.2095	0.0144	0.0689	33.66	0.09	33.75
Rex Sole	0.0035	0.0004	0.1093	0.57	--	0.57
Rock Sole	--	--	--	--	0.11	0.11
Sanddab Unid	--	--	--	--	0.63	0.63
Pacific hake	0.1061	0.0113	0.1063	17.05	0.04	17.09
Petrale sole	0.0052	0.0009	0.1728	0.83	0.43	1.26
Sablefish (South of 36° N. lat.)	0.0003	0.0001	0.1840	0.05	0.00	0.05
Shortbelly rockfish	0.0002	0.0001	0.5426	0.03	--	0.03
Spiny dogfish	0.0024	0.0009	0.3724	0.38	--	0.38
Splitnose rockfish (South of 40°10' N. lat.)	0.0001	0.0000	0.4974	0.02	--	0.02
<b>Non-groundfish species</b>						
California halibut	0.0003	0.0001	0.3156	0.05	2.04	2.09
Non-FMP flatfish						
Hornyhead Turbot	0.0107	0.0013	0.1176	1.73	--	1.73
Longfin Sanddab	0.0111	0.0017	0.1541	1.78	--	1.78
Slender Sole	0.0155	0.0035	0.2245	2.49	--	2.49
Other nongroundfish						
Sculpin Unid	0.0005	0.0001	0.2845	0.08	0.02	0.10
Skate Unid	0.0001	0.0000	0.0378	0.02	1.01	1.03
Shared ecosystem component species						
Non-Eulachon Smelt Unid	0.0002	0.0001	0.3813	0.03	--	0.03
Non-Humboldt Squid Unid	0.0022	0.0004	0.1665	0.36	--	0.36

**Table 6. LE Sablefish Primary Fixed Gear.**

Observed discard ratios, SEs, CVs, estimated discard (mt), landings (mt), and fishing mortality estimates (mt) from the LE sablefish endorsed primary season (tier endorsed) fixed gear fleet. Ratios are computed as the observed discard weight divided by observed weight of retained sablefish (adjusted to fish tickets). Discard ratios were multiplied by fleet landings of sablefish to generate discard estimates for each gear type; see Table 9 for total mortality across non-IFQ, non-nearshore fixed gear sectors. Effort by pot gear in this fishery only occurred of north 36° N lat.

Limited Entry Sablefish Endorsed Primary Season	Longline - Coast			Longline - North of 36° N lat.			Longline - South of 36° N lat.			Pot - North of 36° N lat.					
	Observed vessels	Observed trips	Observed sets	Expansion factor: Fleet landings of sablefish (mt)			Expansion factor: Fleet landings of sablefish (mt)			Observed vessels	Observed trips	Observed sets	Expansion factor: Fleet landings		
	25	109	694	1048			13			3	14	186	375		
	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard Ratio	SE	CV	Discard	Landed	Estimate
<b>Groundfish species</b>															
Arrowtooth flounder	0.0249	0.0021	0.0848	26.07	1.56	27.63	0.32	--	0.32	0.0005	0.0001	0.2615	0.20	0.02	0.22
Big skate	0.0005	0.0001	0.2780	0.48	2.41	2.88	0.01	--	0.01	--	--	--	--	--	--
Black rockfish (California)	--	--	--	--	0.67	0.67	--	--	--	--	--	--	--	--	--
Bocaccio rockfish (South of 40°10' N. lat.)	0.0000	--	--	0.00	0.19	0.19	0.00	--	0.00	--	--	--	--	--	--
Cabezon (California)	--	--	--	--	0.18	0.18	--	--	--	--	--	--	--	--	--
Canary rockfish	0.0006	0.0003	0.6151	0.59	1.18	1.77	0.01	--	0.01	--	--	--	--	--	--
Chilipepper rockfish (South of 40°10' N. lat.)	0.0001	0.0000	0.4697	0.11	0.06	0.17	0.00	--	0.00	--	--	--	--	--	--
Darkblotched rockfish	0.0003	0.0001	0.2304	0.30	2.04	2.35	0.00	--	0.00	0.0000	--	--	0.01	0.01	0.03
Dover sole	0.0007	0.0001	0.0840	0.68	1.28	1.97	0.01	0.02	0.03	0.0000	0.0000	0.1719	0.02	0.27	0.28
Ecosystem component species															
Aleutian Skate	0.0001	0.0000	0.2998	0.07	--	0.07	0.00	--	0.00	--	--	--	--	--	--
Black Skate	0.0003	0.0001	0.2010	0.30	--	0.30	0.00	--	0.00	--	--	--	--	--	--
California Skate	0.0001	0.0000	0.3360	0.12	--	0.12	0.00	--	0.00	--	--	--	--	--	--
Giant Grenadier	0.0008	0.0002	0.2425	0.88	--	0.88	0.01	--	0.01	0.0012	0.0002	0.1895	0.43	--	0.43
Grenadier Unid	0.0030	0.0010	0.3225	3.18	3.50	6.68	0.04	--	0.04	0.0002	0.0001	0.3282	0.09	--	0.09
Pacific Flatnose	0.0002	0.0001	0.3566	0.22	--	0.22	0.00	--	0.00	0.0001	0.0000	0.2371	0.03	--	0.03
Pacific Grenadier	0.0039	0.0020	0.5002	4.13	--	4.13	0.05	--	0.05	0.0002	0.0001	0.2625	0.09	--	0.09
Sandpaper Skate	0.0026	0.0003	0.1018	2.69	--	2.69	0.03	--	0.03	0.0000	--	--	0.00	--	0.00
Southern Shark	0.0004	0.0000	0.0599	0.45	--	0.45	0.01	--	0.01	--	--	--	--	--	--
Spotted Ratfish	0.0026	0.0004	0.1389	2.69	--	2.69	0.03	--	0.03	--	--	--	--	--	--
Lingcod (North of 40°10' N. lat.)	0.0017	0.0004	0.2515	1.82	7.63	7.76	--	--	--	0.0000	--	--	0.01	1.91	1.92
7% discard mortality (Line)‡	--	--	--	0.13	--	--	--	--	--	--	--	--	--	--	--
Lingcod (South of 40°10' N. lat.)	0.0001	0.0000	0.6098	0.07	3.42	3.43	0.00	--	0.00	--	--	--	--	0.35	0.35
7% discard mortality (Line)‡	--	--	--	0.00	--	--	0.00	--	--	--	--	--	--	--	--
Longnose skate	0.0794	0.0062	0.0778	83.23	36.82	78.44	1.01	--	0.51	--	--	--	--	0.03	0.03
50% discard mortality (Fixed Gear)‡	--	--	--	41.61	--	--	0.51	--	--	--	--	--	--	--	--
Longspine thornyhead (North of 34°27' N. lat.)	0.0007	0.0002	0.3178	0.72	0.97	1.70	0.01	0.04	0.05	0.0000	0.0000	0.2249	0.01	0.01	0.03
Longspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	--	0.16	0.16	--	--	--	--	--	--
Minor nearshore rockfish (North of 40°10' N. lat.)															
Blue/Deacon Rockfish	--	--	--	--	0.06	0.06	--	--	--	--	--	--	--	--	--
China Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--
Copper Rockfish	--	--	--	--	0.09	0.09	--	--	--	--	--	--	--	--	--
Olive Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--
Quillback Rockfish	--	--	--	--	0.05	0.05	--	--	--	--	--	--	--	--	--
Minor nearshore rockfish (South of 40°10' N. lat.)															
Black and Yellow Rockfish	--	--	--	--	0.05	0.05	--	--	--	--	--	--	--	--	--
Blue/Deacon Rockfish	--	--	--	--	0.01	0.01	--	--	--	--	--	--	--	--	--
Brown Rockfish	--	--	--	--	0.04	0.04	--	--	--	--	--	--	--	--	--
China Rockfish	--	--	--	--	0.19	0.19	--	--	--	--	--	--	--	--	--
Copper Rockfish	--	--	--	--	0.94	0.94	--	--	--	--	--	--	--	--	--
Gopher Rockfish	--	--	--	--	0.01	0.01	--	--	--	--	--	--	--	--	--
Quillback Rockfish	--	--	--	--	0.42	0.42	--	--	--	--	--	--	--	--	--
Minor shelf rockfish (North of 40°10' N. lat.)															
Bocaccio Rockfish	0.0001	0.0000	0.2329	0.07	0.50	0.57	--	--	--	--	--	--	--	--	--
Chilipepper Rockfish	0.0001	0.0000	0.3491	0.12	0.36	0.48	--	--	--	--	--	--	--	--	--
Cowcod Rockfish	0.0000	--	--	0.02	--	0.02	--	--	--	--	--	--	--	--	--
Greenstriped Rockfish	0.0000	0.0000	0.3673	0.01	--	0.01	--	--	--	--	--	--	--	--	--
Redstripe Rockfish	0.0008	0.0001	0.1532	0.82	0.16	0.98	--	--	--	--	--	--	--	--	--
Rosethorn Rockfish	0.0000	0.0000	0.1020	0.05	--	0.05	--	--	--	--	--	--	--	--	--
Shelf Rockfish Unid	0.0003	0.0001	0.2429	0.34	0.07	0.41	--	--	--	--	--	--	0.01	0.01	0.01
Silvergray Rockfish	--	--	--	--	0.03	0.03	--	--	--	--	--	--	0.03	0.03	0.03
Vermilion Rockfish	0.0006	0.0005	0.7326	0.65	0.60	1.25	--	--	--	--	--	--	--	--	--
Minor shelf rockfish (South of 40°10' N. lat.)															
Greenblotched Rockfish	0.0000	--	--	0.00	--	0.00	0.00	--	0.00	--	--	--	--	--	--
Rosethorn Rockfish	--	--	--	--	0.07	0.07	--	--	--	--	--	--	--	--	--
Rosy Rockfish	--	--	--	--	0.03	0.03	--	--	--	--	--	--	--	--	--
Shelf Rockfish Unid	--	--	--	--	0.02	0.02	--	--	--	--	--	--	--	--	--
Vermilion Rockfish	--	--	--	--	0.52	0.52	--	--	--	--	--	--	--	--	--
Yellowtail Rockfish	--	--	--	--	0.08	0.08	--	--	--	--	--	--	--	--	--

‡Mortality rates provided by the Groundfish Management Team (GMT).

Table 6 (continued).

Limited Entry Sablefish Endorsed Primary Season	Longline - Coast			Longline - North of 36° N lat.			Longline - South of 36° N lat.			Pot - North of 36° N lat.					
	Observed vessels	Observed trips	Observed sets	Expansion factor: Fleet landings of sablefish (mt)			Expansion factor: Fleet landings of sablefish (mt)			Observed vessels			Observed trips	Observed sets	Expansion factor: Fleet landings
	25	109	694	1048			13			3			14	186	375
	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard Ratio	SE	CV	Discard	Landed	Estimate
Minor slope rockfish (North of 40°10' N. lat.)															
Aurora Rockfish	0.0000	0.0000	0.2200	0.03	0.06	0.09	--	--	--	--	--	--	--	--	0.00
Bank Rockfish	0.0000	0.0000	0.1691	0.01	--	0.01	--	--	--	--	--	--	--	--	0.00
Blackgill Rockfish	0.0006	0.0002	0.2780	0.59	1.30	1.89	--	--	--	--	--	--	--	--	0.00
Redbanded Rockfish	0.0071	0.0010	0.1406	7.41	12.20	19.61	--	--	--	0.0000	--	--	0.00	0.49	0.50
Rougheye/Blackspotted Rockfish	0.0108	0.0028	0.2578	11.33	25.13	36.47	--	--	--	0.0001	--	--	0.02	0.36	0.38
Sharpchin Rockfish	0.0000	0.0000	0.4320	0.01	--	0.01	--	--	--	--	--	--	--	--	0.00
Shortraker Rockfish	0.0017	0.0003	0.1813	1.74	1.82	3.56	--	--	--	--	--	--	--	--	0.08
Shortraker/Rougheye/Blackspotted Rockfish	0.0008	0.0002	0.2793	0.79	--	0.79	--	--	--	--	--	--	--	--	--
Slope Rockfish Unid	0.0000	0.0000	0.1570	0.02	0.95	0.97	--	--	--	0.0000	--	--	0.00	0.17	0.17
Splintnose Rockfish	--	--	--	--	0.04	0.04	--	--	--	--	--	--	--	--	0.00
Yellowmouth Rockfish	--	--	--	--	1.81	1.81	--	--	--	--	--	--	--	--	--
Minor slope rockfish (South of 40°10' N. lat.)															
Aurora Rockfish	0.0000	--	--	0.00	0.05	0.05	0.00	0.00	0.00	--	--	--	--	--	--
Blackgill Rockfish	0.0001	0.0000	0.2171	0.05	5.45	5.50	0.00	0.44	0.44	--	--	--	--	0.03	0.03
Redbanded Rockfish	0.0001	0.0000	0.2956	0.05	0.02	0.08	0.00	--	0.00	--	--	--	--	0.02	0.02
Rougheye/Blackspotted Rockfish	0.0001	0.0000	0.3743	0.06	0.01	0.07	0.00	--	0.00	--	--	--	--	--	--
Slope Rockfish Unid	--	--	--	--	2.52	2.52	--	--	--	0.0000	--	--	0.01	0.14	0.15
Mixed thornyheads															
Shortspine/Longspine Thornyhead	0.0005	0.0001	0.1991	0.48	0.12	0.60	0.01	--	0.01	0.0000	--	--	0.00	0.07	0.07
Other flatfish															
Flatfish Unid	--	--	--	--	0.02	0.02	--	--	--	--	--	--	--	--	--
Rock Sole	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--
Other groundfish															
Kelp Greenling (California)	--	--	--	--	0.06	0.06	--	--	--	--	--	--	--	--	--
Pacific cod	0.0002	0.0000	0.1263	0.20	1.67	1.87	0.00	--	0.00	--	--	--	--	--	--
Pacific hake	0.0002	0.0000	0.1672	0.23	0.01	0.24	0.00	--	0.00	--	--	--	--	--	--
Pacific ocean perch (North of 40°10' N. lat.)	0.0001	0.0000	0.3532	0.08	0.16	0.24	0.00	--	0.00	--	--	--	--	--	0.00
Petrale sole	0.0002	0.0000	0.2264	0.23	0.77	0.99	0.00	--	0.00	--	--	--	--	0.01	0.01
Sablefish (North of 36° N. lat.)	0.1676	0.0111	0.0663	175.62	1047.60	1082.73	--	--	--	0.1438	0.0233	0.1618	53.99	375.48	386.28
20% discard mortality (Fixed Gear)‡	--	--	--	35.12	--	--	--	--	--	--	--	--	10.80	--	--
Sablefish (South of 36° N. lat.)	--	--	--	--	--	--	0.00	12.77	12.77	--	--	--	--	--	--
20% discard mortality (Fixed Gear)‡	--	--	--	--	--	--	0.00	--	--	--	--	--	--	--	--
Shortspine thornyhead (North of 34°27' N. lat.)	0.0030	0.0004	0.1482	3.11	23.34	26.44	0.04	0.99	1.02	0.0000	--	--	0.01	0.54	0.55
Shortspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	--	5.54	5.54	--	--	--	--	--	--
Spiny dogfish	0.1012	0.0125	0.1234	106.06	0.21	53.24	1.29	--	0.65	0.0001	--	--	0.03	--	0.03
50% discard mortality (Line)‡	--	--	--	53.03	--	--	0.65	--	--	--	--	--	--	--	--
Widow rockfish	0.0001	0.0000	0.2263	0.09	0.26	0.36	0.00	--	0.00	--	--	--	--	--	0.00
YELLOWWEY ROCKFISH	0.0008	0.0001	0.1552	0.82	--	0.82	0.01	--	0.01	0.0000	--	--	0.01	--	0.01
Yellowtail rockfish (North of 40°10' N. lat.)	0.0003	0.0001	0.2954	0.34	0.46	0.80	--	--	--	--	--	--	--	--	0.00
Non-groundfish species															
Dungeness crab	0.0000	0.0000	0.2415	0.02	--	0.02	0.00	--	0.00	0.0010	0.0002	0.2373	0.36	--	0.36
Non-FMP flatfish															
Deepsea Sole	0.0000	--	--	0.00	--	0.00	0.00	--	0.00	0.0001	0.0000	0.2125	0.02	--	0.02
Other nongroundfish															
Sculpin Unid	0.0000	--	--	0.00	--	0.00	0.00	--	0.00	--	--	--	--	--	--
Skate Unid	0.0006	0.0001	0.1789	0.60	0.44	1.04	0.01	--	0.01	--	--	--	--	--	--
Squid Unid	--	--	--	--	0.02	0.02	--	--	--	--	--	--	--	--	--
Shared ecosystem component species															
Smelt Unid	--	--	--	--	0.03	0.03	--	--	--	--	--	--	--	--	--

**Table 7. LE Non-Primary Fixed Gear.**

Observed discard ratios, SE, CV, estimated discard (mt), landings (mt), and fishing mortality estimates (mt) from the LE non-endorsed fixed gear fleet. Ratios are computed as the observed discard weight divided by the observed weight of FMP groundfish, adjusted to fish tickets. The observed OA discard ratios were used for pot gear, as no pot was observed in this sector. Pot landings in this sector only occurred north of 36° N. latitude. Discard ratios were multiplied by fleet landings of FMP groundfish to generate discard estimates for each gear type; see Table 9 for total mortality across all non-IFQ non-nearshore fixed gear sectors.

Limited Entry Non-Endorsed Fixed Gear	Longline - North of 36° N lat.						Longline - South of 36° N lat.						Pot - North of 36° N lat.					
	Observed			Expansion factor:			Observed			Expansion factor:			Observed			Expansion factor:		
	vessels			Fleet landings			vessels			Fleet landings			vessels			Fleet landings		
	6	12	15	283	6	22	56	502	6	22	56	502	6	12	15	283	6	22
	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard Ratio	SE	CV	Discard	Landed	Estimate
<b>Groundfish species</b>																		
Arrowtooth flounder	--	--	--	--	0.29	0.29	--	--	--	--	--	--	0.0040	0.0009	0.2291	0.06	--	0.06
Big skate	--	--	--	--	0.39	0.39	0.0025	0.0006	0.2475	1.23	--	1.23	--	--	--	--	--	--
Black rockfish (California)	--	--	--	--	10.17	10.17	--	--	--	--	--	--	--	--	--	--	--	--
Bocaccio rockfish (South of 40°10' N. lat.)	--	--	--	--	0.21	0.21	--	--	--	--	1.58	1.58	--	--	--	--	--	--
Cabezon (California)	--	--	--	--	0.13	0.13	--	--	--	--	0.00	0.00	0.0022	0.0004	0.1735	0.03	0.59	0.62
California scorpionfish (South of 34°27' N. lat.)	--	--	--	--	--	--	--	--	--	--	1.12	1.12	0.0001	0.0000	0.3508	0.00	--	0.00
Canary rockfish	--	--	--	--	0.32	0.32	--	--	--	--	0.24	0.24	--	--	--	--	0.00	0.00
Chilipepper rockfish (South of 40°10' N. lat.)	--	--	--	--	0.05	0.05	--	--	--	--	0.03	0.03	--	--	--	--	--	--
Darkblotched rockfish	--	--	--	--	0.81	0.81	--	--	--	--	--	--	--	--	--	--	--	--
Dover sole	--	--	--	--	0.59	0.59	0.0018	0.0006	0.3113	0.92	0.88	1.80	0.0028	0.0005	0.1826	0.04	--	0.04
<b>Ecosystem component species</b>																		
Black Skate	--	--	--	--	--	--	0.0095	0.0033	0.3476	4.76	0.01	4.78	--	--	--	--	--	--
California Grenadier	--	--	--	--	--	--	0.0004	0.0001	0.2970	0.18	--	0.18	--	--	--	--	--	--
California Skate	--	--	--	--	--	--	--	--	--	--	0.01	0.01	--	--	--	--	--	--
Giant Grenadier	0.0023	0.0009	0.4146	0.64	--	0.64	0.01	0.00	0.2992	6.16	0.32	6.47	--	--	--	--	--	--
Grenadier Unid	0.0004	--	--	0.11	7.64	7.74	0.0002	--	--	0.11	3.62	3.73	--	--	--	--	--	--
Pacific Flatnose	--	--	--	--	--	--	0.00	--	--	0.14	--	0.14	--	--	--	--	--	--
Pacific Grenadier	0.0007	0.0003	0.4037	0.19	--	0.19	0.01	0.00	0.5405	4.61	0.66	5.26	--	--	--	--	--	--
Sandpaper Skate	--	--	--	--	--	--	--	--	--	--	--	--	0.0001	--	--	0.00	--	0.00
Smooth Grenadier	--	--	--	--	--	--	0.0000	--	--	0.01	--	0.01	--	--	--	--	--	--
Southern Shark	--	--	--	--	--	--	0.0000	--	--	0.0178	0.04	0.05	--	--	--	--	--	--
Spotted Ratfish	0.0004	0.0001	0.2709	0.11	--	0.11	--	--	--	--	--	--	0.0001	0.0000	0.1909	0.00	--	0.00
Lingcod (North of 40°10' N. lat.)	--	--	--	--	2.13	2.13	--	--	--	--	--	--	0.0016	0.0002	0.1351	0.02	0.70	0.72
7% discard mortality (Line)‡	--	--	--	--	--	--	--	--	--	--	1.44	1.44	0.0010	0.0003	0.3355	0.01	0.26	0.28
Lingcod (South of 40°10' N. lat.)	--	--	--	--	0.89	0.89	--	--	--	--	--	--	--	--	--	--	--	--
7% discard mortality (Line)‡	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Longnose skate	0.0136	0.0043	0.3182	3.85	3.46	5.38	0.0214	0.0070	0.3257	10.74	1.69	7.06	--	--	--	--	--	--
50% discard mortality (Fixed Gear)‡	--	--	--	1.92	--	--	--	--	--	5.37	--	--	--	--	--	--	--	--
Longspine thornyhead (North of 34°27' N. lat.)	0.0001	0.0000	0.2736	0.02	1.35	1.37	0.01	0.00	0.2620	2.60	1.66	4.26	0.0000	--	--	0.00	--	0.00
Longspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	0.00	0.00	0.2579	0.7873	10.93	11.72	--	--	--	--	--	--
<b>Minor nearshore rockfish (North of 40°10' N. lat.)</b>																		
Blue/Deacon Rockfish	--	--	--	--	0.64	0.64	--	--	--	--	--	--	--	--	--	--	--	--
China Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Copper Rockfish	--	--	--	--	0.09	0.09	--	--	--	--	--	--	--	--	--	--	--	--
Nearshore Rockfish Unid	--	--	--	--	0.02	0.02	--	--	--	--	--	--	--	--	--	--	--	--
Olive Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Quillback Rockfish	--	--	--	--	0.19	0.19	--	--	--	--	--	--	--	--	--	--	--	--
<b>Minor nearshore rockfish (South of 40°10' N. lat.)</b>																		
Black and Yellow Rockfish	--	--	--	--	--	--	--	--	--	--	0.00	0.00	0.0002	0.0000	0.1179	0.00	0.54	0.55
Blue/Deacon Rockfish	--	--	--	--	--	--	--	--	--	--	0.02	0.02	--	--	--	--	--	--
Brown Rockfish	--	--	--	--	--	--	--	--	--	--	0.00	0.00	--	--	--	--	--	--
China Rockfish	--	--	--	--	0.04	0.04	--	--	--	--	--	--	--	--	--	--	0.02	0.02
Copper Rockfish	--	--	--	--	0.16	0.16	--	--	--	--	0.06	0.06	--	--	--	--	--	--
Gopher Rockfish	--	--	--	--	0.05	0.05	--	--	--	--	0.00	0.00	0.0000	0.0000	0.3865	0.00	0.55	0.55
Grass Rockfish	--	--	--	--	--	--	--	--	--	--	0.01	0.01	0.0000	--	--	0.00	0.09	0.09
Kelp Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.02	0.02
Nearshore Rockfish Unid	--	--	--	--	0.01	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Olive Rockfish	--	--	--	--	--	--	--	--	--	--	0.00	0.00	--	--	--	--	--	--
Quillback Rockfish	--	--	--	--	0.07	0.07	--	--	--	--	--	--	--	--	--	--	--	--
Treefish Rockfish	--	--	--	--	--	--	--	--	--	--	0.00	0.00	0.0002	0.0000	0.1373	0.00	0.00	0.00
<b>Minor shelf rockfish (North of 40°10' N. lat.)</b>																		
Bocaccio Rockfish	--	--	--	--	0.09	0.09	--	--	--	--	--	--	--	--	--	--	--	--
Chilipepper Rockfish	--	--	--	--	0.02	0.02	--	--	--	--	--	--	--	--	--	--	--	--
Flag Rockfish	--	--	--	--	0.08	0.08	--	--	--	--	--	--	--	--	--	--	--	--
Greenstriped Rockfish	--	--	--	--	0.01	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Rosethorn Rockfish	--	--	--	--	0.02	0.02	--	--	--	--	--	--	0.0000	--	--	0.00	--	0.00
Rosy Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Shelf Rockfish Unid	--	--	--	--	0.09	0.09	--	--	--	--	--	--	--	--	--	--	--	--

‡Mortality rates provided by the Groundfish Management Team (GMT).

**Table 7 (continued).**

Limited Entry Non-Endorsed Fixed Gear	Longline - North of 36° N lat.						Longline - South of 36° N lat.						Pot - North of 36° N lat.					
	Observed vessels			Observed trips			Observed vessels			Observed trips			Observed vessels			Observed trips		
	12			15			22			56			502			14		
	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard Ratio	SE	CV	Discard	Landed	Estimate
Silvergray Rockfish	---	---	---	---	0.00	0.00	---	---	---	---	---	---	---	---	---	---	---	---
Vermilion Rockfish	---	---	---	---	0.09	0.09	---	---	---	---	---	---	---	---	---	---	---	---
Minor shelf rockfish (South of 40°10' N. lat.)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Flag Rockfish	---	---	---	---	---	---	---	---	---	---	0.05	0.05	---	---	---	---	---	---
Greenblotched Rockfish	---	---	---	---	0.02	0.02	---	---	---	---	0.01	0.01	---	---	---	---	---	---
Greenspotted Rockfish	---	---	---	---	0.04	0.04	---	---	---	---	0.50	0.50	---	---	---	---	---	---
Greenstriped Rockfish	---	---	---	---	0.00	0.00	---	---	---	---	0.03	0.03	---	---	---	---	---	---
Mexican Rockfish	---	---	---	---	---	---	---	---	---	---	0.03	0.03	---	---	---	---	---	---
Rosethorn Rockfish	---	---	---	---	0.02	0.02	---	---	---	---	0.00	0.00	---	---	---	---	---	---
Rosy Rockfish	---	---	---	---	0.00	0.00	---	---	---	---	0.00	0.00	---	---	---	---	---	---
Shelf Rockfish Unid	---	---	---	---	0.00	0.00	---	---	---	---	0.04	0.04	---	---	---	---	---	---
Speckled Rockfish	---	---	---	---	---	---	---	---	---	---	0.22	0.22	---	---	---	---	---	---
Squarespot Rockfish	---	---	---	---	---	---	---	---	---	---	0.04	0.04	---	---	---	---	---	---
Starry Rockfish	---	---	---	---	0.06	0.06	---	---	---	---	0.34	0.34	---	---	---	---	---	---
Vermilion Rockfish	---	---	---	---	0.60	0.60	---	---	---	---	14.80	14.80	---	---	---	---	---	---
Yellowtail Rockfish	---	---	---	---	0.00	0.00	---	---	---	---	0.18	0.18	---	---	---	---	---	---
Minor slope rockfish (North of 40°10' N. lat.)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Aurora Rockfish	---	---	---	---	0.01	0.01	---	---	---	---	---	---	---	---	---	---	---	---
Blackgill Rockfish	---	---	---	---	1.76	1.76	---	---	---	---	---	---	---	---	---	0.01	0.01	---
Redbanded Rockfish	---	---	---	---	3.42	3.42	---	---	---	---	---	---	0.0001	0.0000	0.2572	0.00	0.01	0.01
Rougheye/Blackspotted Rockfish	---	---	---	---	3.14	3.14	---	---	---	---	---	---	---	---	---	---	---	---
Shortraker Rockfish	---	---	---	---	0.22	0.22	---	---	---	---	---	---	---	---	---	---	---	---
Slope Rockfish Unid	---	---	---	---	0.42	0.42	---	---	---	---	---	---	---	---	---	---	---	---
Splitnose Rockfish	---	---	---	---	0.01	0.01	---	---	---	---	---	---	---	---	---	---	---	---
Yellowmouth Rockfish	---	---	---	---	0.00	0.00	---	---	---	---	---	---	---	---	---	---	---	---
Minor slope rockfish (South of 40°10' N. lat.)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Aurora Rockfish	---	---	---	---	0.06	0.06	0.0000	---	---	0.02	0.59	0.61	0.0000	---	---	0.00	---	0.00
Bank Rockfish	---	---	---	---	---	---	---	---	---	---	0.25	0.25	---	---	---	---	---	---
Blackgill Rockfish	---	---	---	---	4.02	4.02	0.0001	---	---	0.05	14.39	14.45	0.0005	0.0001	0.2754	0.01	---	0.01
Redbanded Rockfish	---	---	---	---	0.01	0.01	---	---	---	---	---	---	0.0004	0.0001	0.2348	0.01	---	0.01
Shortraker Rockfish	---	---	---	---	0.01	0.01	---	---	---	---	---	---	---	---	---	---	---	---
Shortraker/Rougheye/Blackspotted Rockfish	---	---	---	---	---	---	0.0006	---	---	0.28	---	0.2786	---	---	---	---	---	---
Slope Rockfish Unid	---	---	---	---	0.08	0.08	---	---	---	---	0.20	0.20	---	---	---	---	---	---
Mixed thornyheads	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Shortspine/Longspine Thornyhead	---	---	---	---	0.07	0.07	---	---	---	---	0.02	0.02	---	---	---	---	---	---
Other flatfish	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Pacific Sanddab	---	---	---	---	---	---	0.0000	---	---	0.01	2.20	2.21	---	---	---	---	---	---
Sand Sole	---	---	---	---	---	---	---	---	---	---	0.00	0.00	---	---	---	---	---	---
Sanddab Unid	---	---	---	---	0.00	0.00	---	---	---	---	1.65	1.65	---	---	---	---	---	---
Other groundfish	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Kelp Greenling (California)	---	---	---	---	0.01	0.01	---	---	---	---	0.35	0.35	---	---	---	0.16	0.16	---
Pacific cod	---	---	---	---	0.01	0.01	---	---	---	---	---	---	---	---	---	---	---	---
Pacific hake	0.0004	0.0001	0.2947	0.11	0.12	0.23	0.0016	0.0006	0.3547	0.8240	0.08	0.9059	---	---	---	---	---	---
Pacific ocean perch (North of 40°10' N. lat.)	---	---	---	---	0.02	0.02	---	---	---	---	---	---	---	---	---	---	---	---
Petrale sole	---	---	---	---	0.16	0.16	---	---	---	---	0.01	0.01	0.0001	0.0000	0.2306	0.00	---	0.00
Sablefish (North of 36° N. lat.)	0.1481	0.0734	0.4958	41.85	221.80	230.17	---	---	---	---	---	---	0.1890	0.0429	0.2270	2.74	11.51	12.06
20% discard mortality (Fixed Gear)†	---	---	---	---	8.37	---	---	---	---	---	---	---	---	---	---	0.55	---	---



**Table 7 (continued).**

Limited Entry Non-Endorsed Fixed Gear	Longline - North of 36° N lat.						Longline - South of 36° N lat.						Pot - North of 36° N lat.					
	Observed vessels			Expansion factor:			Observed vessels			Expansion factor:			OA Observed			Expansion factor:		
	trips			Fleet landings			trips			Fleet landings			(see Table 8b)			Fleet landings		
	6	12	15	283	6	22	56	502	6	22	56	502	6	12	14	6	12	14
	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard Ratio	SE	CV	Discard	Landed	Estimate
Sablefish (South of 36° N. lat.)	--	--	--	--	--	--	0.0389	0.0279	0.7187	19.49	295.01	298.91	--	--	--	--	--	--
20% discard mortality (Fixed Gear)‡										3.90								
Shortspine thornyhead (North of 34°27' N. lat.)	0.0023	0.0010	0.4245	0.64	15.54	16.18	0.0001	--	--	0.06	15.33	15.39	0.0003	0.0001	0.3179	0.00	0.02	0.02
Shortspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	0.0066	0.0033	0.5013	3.33	130.43	133.76	--	--	--	--	--	--
Spiny dogfish	0.0010	0.0004	0.3931	0.29	1.03	1.17	0.0001	--	--	0.05	0.02	0.04	--	--	--	--	0.01	0.01
50% discard mortality (Line)‡				0.14						0.02								
Splitnose rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	--	0.03	0.03	--	--	--	--	--	--
Widow rockfish	--	--	--	--	0.02	0.02	--	--	--	--	0.70	0.70	--	--	--	--	--	--
Yellowtail rockfish (North of 40°10' N. lat.)	--	--	--	--	0.05	0.05	--	--	--	--	--	--	--	--	--	--	--	--
<b>Non-groundfish species</b>																		
California halibut	--	--	--	--	--	--	--	--	--	--	0.16	0.16	--	--	--	--	--	--
Dungeness crab	--	--	--	--	--	--	--	--	--	--	--	--	0.0012	0.0004	0.2993	0.02	0.25	0.27
Non-FMP flatfish	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	--	--	0.00	--	0.00
Deepsea Sole	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other nongroundfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
California Sheephead	--	--	--	--	--	--	--	--	--	--	0.10	0.10	0.0152	0.0018	0.1193	0.22	--	0.22
Skate Unid	--	--	--	--	0.05	0.05	0.0066	0.0031	0.4688	3.32	0.05	3.37	--	--	--	--	--	--

**Table 8a. OA Fixed Gear, Longline.**

Observed discard ratios, SE, CV, estimated discard (mt), landings (mt), and fishing mortality estimates (mt) from the OA fixed gear longline fleet. Ratios are computed as the observed discard weight divided by the observed weight of retained sablefish or FMP groundfish (adjusted to fish tickets). Discard ratios were multiplied by fleet landings of FMP groundfish to generate discard estimates; see Table 9 for total mortality across all non-IFQ non-nearshore fixed gear sectors.

Open Access Fixed Gear	Longline - Coastwide			North of 36° N lat. Expansion factor: Fleet landings of groundfish (mt)			South of 36° N lat. Expansion factor: Fleet landings of groundfish (mt)		
	Observed vessels	Observed trips	Observed sets	202			17		
	43	60	78						
	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard	Landed	Estimate
<b>Groundfish species</b>									
Arrowtooth flounder	0.0145	0.0049	0.3362	4.34	0.69	5.03	0.72	--	0.72
Big skate	0.0013	--	--	0.38	1.19	1.58	0.06	--	0.06
Black rockfish (California)	0.0001	--	--	0.02	0.20	0.22	0.00	--	0.00
Black rockfish (Oregon)	--	--	--	--	3.15	3.15	--	--	--
Bocaccio rockfish (South of 40°10' N. lat.)	0.0004	--	--	0.13	1.13	1.26	0.02	2.23	2.25
Cabezon (California)	0.0004	0.0001	0.3470	0.13	--	0.13	0.02	--	0.02
Cabezon (Oregon)	--	--	--	--	0.15	0.15	--	--	--
Canary rockfish	0.0007	0.0002	0.2171	0.21	2.01	2.22	0.03	0.43	0.46
Chilipepper rockfish (South of 40°10' N. lat.)	--	--	--	--	0.61	0.61	--	0.16	0.16
Darkblotched rockfish	0.0021	0.0006	0.2863	0.61	1.63	2.25	0.10	--	0.10
Dover sole	0.0019	0.0007	0.3986	0.56	0.09	0.65	0.09	--	0.09
<b>Ecosystem component species</b>									
Black Skate	0.0009	0.0005	0.4980	0.27	--	0.27	0.04	--	0.04
Grenadier Unid	--	--	--	--	3.73	3.73	--	--	--
Sandpaper Skate	0.0006	0.0001	0.2108	0.17	--	0.17	0.03	--	0.03
Southern Shark	--	--	--	--	--	--	--	0.26	0.26
Spotted Ratfish	0.0031	0.0006	0.2090	0.91	--	0.91	0.15	--	0.15
Lingcod (North of 40°10' N. lat.)	0.0050	0.0013	0.2652	1.49	40.81	40.91	--	--	--
7% discard mortality (Line)‡	--	--	--	0.10	--	--	--	--	--
Lingcod (South of 40°10' N. lat.)	0.0042	0.0007	0.1618	1.24	21.47	21.56	0.20	6.82	6.83
7% discard mortality (Line)‡	--	--	--	0.09	--	--	0.01	--	--
Longnose skate	0.0603	0.01251	0.2074	18.02	4.54	13.55	2.98	--	1.49
50% discard mortality (Fixed Gear)‡	--	--	--	9.01	--	--	1.49	--	--
Longspine thornyhead (North of 34°27' N. lat.)	0.0000	--	--	0.01	--	0.01	0.00	--	0.00
Longspine thornyhead (South of 34°27' N. lat.)	0.0000	--	--	0.01	--	0.01	0.00	0.15	0.15
<b>Minor nearshore rockfish (North of 40°10' N. lat.)</b>									
Blue/Deacon Rockfish	0.0001	--	--	0.02	0.10	0.12	--	--	--
China Rockfish	--	--	--	--	0.02	0.02	--	--	--
Copper Rockfish	0.0001	--	--	0.04	0.02	0.06	--	--	--
Grass Rockfish	--	--	--	--	0.00	0.00	--	--	--
Quillback Rockfish	0.0000	--	--	0.01	0.04	0.05	--	--	--
<b>Minor nearshore rockfish (South of 40°10' N. lat.)</b>									
Blue/Deacon Rockfish	0.0001	0.0000	0.3087	0.02	--	0.02	0.00	--	0.00
Brown Rockfish	0.0001	--	--	0.03	--	0.03	0.01	--	0.01
Copper Rockfish	0.0002	--	--	0.05	--	0.05	0.01	0.01	0.02
Olive Rockfish	0.0001	--	--	0.02	--	0.02	0.00	--	0.00
<b>Minor shelf rockfish (North of 40°10' N. lat.)</b>									
Bocaccio Rockfish	--	--	--	--	0.01	0.01	--	--	--
Chilipepper Rockfish	--	--	--	--	0.05	0.05	--	--	--
Greenspotted Rockfish	--	--	--	--	0.00	0.00	--	--	--
Greenstriped Rockfish	0.0006	0.0003	0.4749	0.19	0.02	0.20	--	--	--
Rosethorn Rockfish	0.0001	0.0001	0.4351	0.04	0.01	0.05	--	--	--
Rosy Rockfish	--	--	--	--	0.00	0.00	--	--	--
Shelf Rockfish Unid	0.0004	--	--	0.13	0.28	0.41	--	--	--
Silvergray Rockfish	--	--	--	--	0.09	0.09	--	--	--
Tiger Rockfish	--	--	--	--	0.01	0.01	--	--	--
Vermilion Rockfish	--	--	--	--	0.14	0.14	--	--	--
<b>Minor shelf rockfish (South of 40°10' N. lat.)</b>									
Flag Rockfish	--	--	--	--	--	--	--	0.09	0.09
Greenblotched Rockfish	--	--	--	--	--	--	--	0.02	0.02
Greenspotted Rockfish	--	--	--	--	0.10	0.10	--	0.94	0.94
Greenstriped Rockfish	0.0000	--	--	0.01	0.00	0.01	0.00	0.10	0.10
Honeycomb Rockfish	--	--	--	--	--	--	--	0.00	0.00
Mexican Rockfish	--	--	--	--	--	--	--	0.71	0.71
Pink Rockfish	--	--	--	--	--	--	--	0.21	0.21

‡Mortality rates provided by the Groundfish Management Team (GMT).

**Table 8a (continued).**

Open Access Fixed Gear	Longline - Coastwide			North of 36° N lat. Expansion factor: Fleet landings of groundfish (mt)			South of 36° N lat. Expansion factor: Fleet landings of groundfish (mt)		
	Observed vessels	Observed trips	Observed sets	202			17		
	43	60	78						
	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard	Landed	Estimate
Rosethorn Rockfish	--	--	--	--	0.00	0.00	--	0.00	0.00
Rosy Rockfish	0.0000	--	--	0.01	0.01	0.02	0.00	0.02	0.03
Shelf Rockfish Unid	--	--	--	--	0.15	0.15	--	0.54	0.54
Speckled Rockfish	--	--	--	--	--	--	--	0.08	0.08
Squarespot Rockfish	--	--	--	--	--	--	--	0.03	0.03
Starry Rockfish	--	--	--	--	0.00	0.00	--	0.31	0.31
Vermilion Rockfish	--	--	--	--	1.85	1.85	--	15.15	15.15
Yellowtail Rockfish	0.0000	--	--	0.01	2.01	2.02	0.00	0.39	0.39
Minor slope rockfish (North of 40°10' N. lat.)									
Aurora Rockfish	--	--	--	--	0.01	0.01	--	--	--
Blackgill Rockfish	--	--	--	--	0.14	0.14	--	--	--
Redbanded Rockfish	0.0037	0.0010	0.2588	1.10	1.91	3.01	--	--	--
Rougheye/Blackspotted Rockfish	0.0639	0.05484	0.8584	19.08	1.86	20.94	--	--	--
Shortraker Rockfish	--	--	--	--	0.10	0.10	--	--	--
Shortraker/Rougheye/Blackspotted Rockfish	0.0004	--	--	0.11	--	0.11	--	--	--
Slope Rockfish Unid	--	--	--	--	0.11	0.11	--	--	--
Splitnose Rockfish	0.0001	--	--	0.04	0.01	0.04	--	--	--
Yellowmouth Rockfish	--	--	--	--	0.01	0.01	--	--	--
Minor slope rockfish (South of 40°10' N. lat.)									
Aurora Rockfish	--	--	--	--	0.00	0.00	--	--	--
Bank Rockfish	--	--	--	--	--	--	--	0.07	0.07
Blackgill Rockfish	0.0007	0.0003	0.4507	0.20	0.64	0.85	0.03	0.80	0.84
Redbanded Rockfish	--	--	--	--	0.07	0.07	--	--	--
Slope Rockfish Unid	--	--	--	--	0.21	0.21	--	0.03	0.03
Mixed thornyheads									
Shortspine/Longspine Thornyhead	0.0001	0.0001	0.4787	0.03	--	0.03	0.01	0.77	0.77
Other flatfish									
Curfin Sole	--	--	--	--	--	--	--	0.03	0.03
Flatfish Unid	--	--	--	--	0.01	0.01	--	--	--
Pacific Sanddab	--	--	--	--	0.02	0.02	--	0.23	0.23
Rock Sole	--	--	--	--	0.04	0.04	--	0.00	0.00
Sand Sole	--	--	--	--	0.02	0.02	--	--	--
Sanddab Unid	--	--	--	--	1.10	1.10	--	0.76	0.76
Other groundfish									
Kelp Greenling (California)	0.0000	--	--	0.01	--	0.01	0.00	--	0.00
Kelp Greenling (Oregon)	--	--	--	--	0.02	0.02	--	--	--
Leopard Shark	--	--	--	--	0.49	0.49	--	0.07	0.07
Other rockfish									
Rockfish Unid	--	--	--	--	0.11	0.11	--	0.05	0.05
Pacific cod	--	--	--	--	0.02	0.02	--	--	--
Pacific hake	0.0009	0.0003	0.3628	0.26	0.04	0.30	0.04	--	0.04
Pacific ocean perch (North of 40°10' N. lat.)	--	--	--	--	0.02	0.02	--	--	--
Petrable sole	0.0003	0.0000	0.1704	0.09	0.69	0.77	0.01	0.02	0.03
Sablefish (North of 36° N. lat.)	0.1955	0.0529	0.2704	58.41	202.29	213.98	--	--	--
20% discard mortality (Fixed Gear)‡				11.68					
Sablefish (South of 36° N. lat.)	--	--	--	--	--	--	--	17.31	17.31
20% discard mortality (Fixed Gear)‡									
Shortspine thornyhead (North of 34°27' N. lat.)	0.0034	0.0010	0.2924	1.03	0.06	1.08	0.17	--	0.17
Shortspine thornyhead (South of 34°27' N. lat.)	0.0012	0.0003	0.2437	0.37	--	0.37	0.06	0.47	0.53
Spiny dogfish	0.0643	0.0288	0.4484	19.19	1.67	11.26	3.17	0.01	1.60
50% discard mortality (Line)‡				9.60			1.59		
Splitnose rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	0.02	0.02
Starry flounder	--	--	--	--	0.02	0.02	--	0.02	0.02
Widow rockfish	--	--	--	--	0.45	0.45	--	0.01	0.01
YELLOWWEYE ROCKFISH	0.0040	0.0015	0.3683	1.19	0.07	1.26	0.20	--	0.20
Yellowtail rockfish (North of 40°10' N. lat.)	0.0003	--	--	0.10	0.18	0.28	--	--	--

**Table 8a (continued).**

Open Access Fixed Gear	Longline - Coastwide			North of 36° N lat. Expansion factor: Fleet landings of groundfish (mt)			South of 36° N lat. Expansion factor: Fleet landings of groundfish (mt)		
	Observed vessels	Observed trips	Observed sets						
	43	60	78	202			17		
	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard	Landed	Estimate
<b>Non-groundfish species</b>									
California halibut	—	—	—	—	0.70	0.70	—	0.77	0.77
Dungeness crab	0.0000	—	—	0.01	0.01	0.02	0.00	—	0.00
Other nongroundfish									
Skate Unit	0.0011	0.0007	0.6063	0.34	0.22	0.55	0.06	—	0.06
Shared ecosystem component species									
Smelt Unit	—	—	—	—	0.02	0.02	—	—	—

**Table 8b. OA Fixed Gear, Pot.**

Observed discard ratios, SE, CV, estimated discard (mt), landings (mt), and fishing mortality estimates (mt) from the OA fixed gear pot fleet. Ratios are computed as the observed discard weight divided by the observed weight of retained sablefish or FMP groundfish (adjusted to fish tickets). Discard ratios were multiplied by fleet landings of FMP groundfish to generate discard estimates; see Table 9 for total mortality across all non-IFQ non-nearshore fixed gear sectors.

Open Access Fixed Gear	Pot - Coastwide			North of 36° N lat.			South of 36° N lat.		
	Observed vessels	Observed trips	Observed sets	Expansion factor: Fleet landings of groundfish (mt)			Expansion factor: Fleet landings of groundfish (mt)		
	43	84	122	194			8		
	Discard Ratio	CV	SE	Discard	Landed	Estimate	Discard	Landed	Estimate
<b>Groundfish species</b>									
Arrowtooth flounder	0.0040	0.0009	0.2291	0.79	0.00	0.79	0.04	--	0.04
Black rockfish (California)	--	--	--	--	0.47	0.47	--	--	--
Bocaccio rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	0.03	0.03
Cabezon (California)	0.0022	0.0004	0.1735	0.44	0.84	1.28	0.02	0.43	0.45
California scorpionfish (South of 34°27' N. lat.)	0.0001	0.0000	0.3508	0.01	--	0.01	0.00	--	0.00
Canary rockfish	--	--	--	--	0.01	0.01	--	--	--
Darkblotched rockfish	--	--	--	--	0.00	0.00	--	--	--
Dover sole	0.0028	0.0005	0.1826	0.55	0.04	0.60	0.03	0.00	0.03
Ecosystem component species									
Sandpaper Skate	0.0001	--	--	0.01	--	0.01	0.00	--	0.00
Spotted Ratfish	0.0001	0.0000	0.1909	0.01	--	0.01	0.00	--	0.00
English sole	--	--	--	--	0.00	0.00	--	--	--
Lingcod (North of 40°10' N. lat.)	0.0016	0.0002	0.1351	0.32	1.30	1.62	--	--	--
Lingcod (South of 40°10' N. lat.)	0.0010	0.0003	0.3355	0.19	1.25	1.44	0.01	0.10	0.11
Longspine thornyhead (North of 34°27' N. lat.)	0.0000	--	--	0.00	0.02	0.02	0.00	--	0.00
Minor nearshore rockfish (South of 40°10' N. lat.)									
Black and Yellow Rockfish	0.0002	0.0000	0.1179	0.05	0.61	0.65	0.00	0.57	0.57
China Rockfish	--	--	--	--	0.00	0.00	--	--	--
Gopher Rockfish	0.0000	0.0000	0.3865	0.01	0.45	0.45	0.00	0.33	0.33
Grass Rockfish	0.0000	--	--	0.01	0.04	0.05	0.00	0.05	0.05
Kelp Rockfish	--	--	--	--	0.02	0.02	--	0.02	0.02
Treefish Rockfish	0.0002	0.0000	0.1373	0.04	--	0.04	0.00	--	0.00
Minor shelf rockfish (North of 40°10' N. lat.)									
Rosethorn Rockfish	0.0000	--	--	0.00	--	0.00	--	--	--
Shelf Rockfish Unid	--	--	--	--	0.01	0.01	--	--	--
Minor shelf rockfish (South of 40°10' N. lat.)									
Greenspotted Rockfish	--	--	--	--	--	--	--	0.01	0.01
Rosethorn Rockfish	--	--	--	--	--	--	--	0.00	0.00
Shelf Rockfish Unid	--	--	--	--	0.01	0.01	--	--	--
Vermilion Rockfish	--	--	--	--	0.00	0.00	--	0.63	0.63
Yellowtail Rockfish	--	--	--	--	0.01	0.01	--	--	--
Minor slope rockfish (North of 40°10' N. lat.)									
Aurora Rockfish	--	--	--	--	0.00	0.00	--	--	--
Blackgill Rockfish	--	--	--	--	0.01	0.01	--	--	--
Redbanded Rockfish	0.0001	0.0000	0.2572	0.01	0.01	0.02	--	--	--
Rougheye/Blackspotted Rockfish	--	--	--	--	0.04	0.04	--	--	--
Slope Rockfish Unid	--	--	--	--	0.07	0.07	--	--	--
Minor slope rockfish (South of 40°10' N. lat.)									
Aurora Rockfish	0.0000	--	--	0.00	--	0.00	0.00	0.01	0.01
Blackgill Rockfish	0.0005	0.0001	0.2754	0.10	0.09	0.19	0.01	0.21	0.22
Redbanded Rockfish	0.0004	0.0001	0.2348	0.08	--	0.08	0.00	--	0.00
Slope Rockfish Unid	--	--	--	--	0.01	0.01	--	0.00	0.00
Mixed thornyheads									
Shortspine/Longspine Thornyhead	--	--	--	--	0.12	0.12	--	0.00	0.00
Other flatfish									
Flatfish Unid	--	--	--	--	--	--	--	0.00	0.00
Pacific Sanddab	--	--	--	--	--	--	--	0.33	0.33
Sanddab Unid	--	--	--	--	0.00	0.00	--	0.11	0.11
Other groundfish									
Kelp Greenling (California)	--	--	--	--	0.22	0.22	--	0.07	0.07
Petrale sole	0.0001	0.0000	0.2306	0.02	0.02	0.05	0.00	--	0.00
Sablefish (North of 36° N. lat.)	0.1890	0.0429	0.2270	37.81	194.34	201.90	--	--	--
20% discard mortality (Fixed Gear)†				7.56			--		

†Mortality rates provided by the Groundfish Management Team (GMT).

**Table 8b (continued).**

Open Access Fixed Gear	Pot - Coastwide			North of 36° N lat. Expansion factor: Fleet landings of groundfish (mt)			South of 36° N lat. Expansion factor: Fleet landings of groundfish (mt)		
	Observed vessels	Observed trips	Observed sets						
	43	84	122	194			8		
	Discard Ratio	CV	SE	Discard	Landed	Estimate	Discard	Landed	Estimate
Sablefish (South of 36° N. lat.)	--	--	--	--	--	--	0.00	7.71	7.71
20% discard mortality (Fixed Gear)‡				--			0.00		
Shortspine thornyhead (North of 34°27' N. lat.)	0.0003	0.0001	0.3179	0.06	0.00	0.07	0.00	--	0.00
Splitnose rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	0.02	0.02
<b>Non-groundfish species</b>									
Dungeness crab	0.0012	0.0004	0.2993	0.24	3.65	3.90	0.01	--	0.01
Non-FMP flatfish									
Deepsea Sole	0.0000	--	--	0.00	--	0.00	0.00	--	0.00
Other nongroundfish									
California Sheephead	0.0152	0.0018	0.1193	3.03	--	3.03	0.16	--	0.16

**Table 9a. LE and OA Fixed Gear Summary.**

Estimated discard (mt), landings (mt), and fishing mortality estimate (mt) of groundfish species in the LE and OA non-nearshore fixed gear sectors. Discard ratios were multiplied by fleet landings of sablefish or groundfish to generate estimated discard.

	Limited Entry - Coastwide				Open Access - Coastwide				LE & OA Coastwide
	Longline Discard	Pot Discard	Landed	LE Total	Longline Discard	Pot Discard	Landed	OA Total	
Groundfish species									
Arrowtooth flounder	26.39	0.26	1.87	28.52	5.05	0.83	0.70	6.58	35.10
Big skate	1.71	--	2.80	4.51	0.44	--	1.19	1.64	6.14
Black rockfish (California)	--	--	10.84	10.84	0.02	--	0.66	0.69	11.52
Black rockfish (Oregon)	--	--	--	--	--	--	3.15	3.15	3.15
Bocaccio rockfish (South of 40°10' N. lat.)	0.00	--	1.97	1.98	0.15	--	3.39	3.54	5.52
Cabazon (California)	--	0.03	0.91	0.94	0.15	0.46	1.26	1.88	2.82
Cabazon (Oregon)	--	--	--	--	--	--	0.15	0.15	0.15
California scorpionfish (South of 34°27' N. lat.)	--	0.00	1.12	1.12	--	0.01	--	0.01	1.13
Canary rockfish	0.59	--	1.75	2.34	0.24	--	2.45	2.69	5.03
Chilipepper rockfish (South of 40°10' N. lat.)	0.11	--	0.14	0.25	--	--	0.77	0.77	1.02
Darkblotched rockfish	0.31	0.01	2.87	3.19	0.71	--	1.64	2.35	5.54
Dover sole	1.61	0.06	3.04	4.71	0.65	0.58	0.14	1.37	6.09
Ecosystem component species									
Aleutian Skate	0.08	--	--	0.08	--	--	--	--	0.08
Black Skate	5.07	--	0.01	5.08	0.32	--	--	0.32	5.40
California Grenadier	0.18	--	--	0.18	--	--	--	--	0.18
California Skate	0.12	--	0.01	0.12	--	--	--	--	0.12
Giant Grenadier	7.68	0.43	0.32	8.43	--	--	--	--	8.43
Grenadier Unid	3.43	0.09	14.76	18.28	--	--	3.73	3.73	22.00
Pacific Flatnose	0.36	0.03	--	0.40	--	--	--	--	0.40
Pacific Grenadier	8.98	0.09	0.66	9.73	--	--	--	--	9.73
Sandpaper Skate	2.72	0.01	--	2.72	0.20	0.01	--	0.22	2.94
Smooth Grenadier	0.01	--	--	0.01	--	--	--	--	0.01
Soupin Shark	0.47	--	0.04	0.51	--	--	0.26	0.26	0.77
Spotted Ratfish	2.84	0.00	--	2.84	1.06	0.01	--	1.08	3.91
English sole	--	--	--	--	--	--	0.00	0.00	0.00
Lingcod (North of 40°10' N. lat.)	1.82	0.03	12.37	12.53	1.49	0.32	42.11	42.53	55.06
7% discard mortality (Line)‡	0.13	--	--	--	0.10	--	--	--	--
Lingcod (South of 40°10' N. lat.)	0.07	0.01	6.37	6.39	1.44	0.20	29.64	29.94	36.33
7% discard mortality (Line)‡	0.00	--	--	--	0.10	--	--	--	--
Longnose skate	98.83	--	42.00	91.41	21.00	--	4.54	15.04	106.45
50% discard mortality (Fixed Gear)‡	49.42	--	--	--	10.50	--	--	--	--
Longspine thornyhead (North of 34°27' N. lat.)	3.35	0.01	4.04	7.40	0.01	0.00	0.02	0.03	7.43
Longspine thornyhead (South of 34°27' N. lat.)	0.79	--	11.10	11.88	0.01	--	0.15	0.16	12.04
Minor nearshore rockfish (North of 40°10' N. lat.)									
Blue/Deacon Rockfish	--	--	0.69	0.69	0.02	--	0.10	0.12	0.81
China Rockfish	--	--	0.00	0.00	--	--	0.02	0.02	0.03
Copper Rockfish	--	--	0.18	0.18	0.04	--	0.02	0.06	0.24
Grass Rockfish	--	--	--	--	--	--	0.00	0.00	0.00
Nearshore Rockfish Unid	--	--	0.02	0.02	--	--	--	--	0.02
Olive Rockfish	--	--	0.00	0.00	--	--	--	--	0.00
Quillback Rockfish	--	--	0.24	0.24	0.01	--	0.04	0.05	0.29
Minor nearshore rockfish (South of 40°10' N. lat.)									
Black and Yellow Rockfish	--	0.00	0.59	0.59	--	0.05	1.18	1.23	1.82
Blue/Deacon Rockfish	--	--	0.03	0.03	0.02	--	--	0.02	0.05
Brown Rockfish	--	--	0.04	0.04	0.04	--	--	0.04	0.08
China Rockfish	--	--	0.24	0.24	--	--	0.00	0.00	0.24
Copper Rockfish	--	--	1.16	1.16	0.06	--	0.01	0.07	1.23
Gopher Rockfish	--	0.00	0.62	0.62	--	0.01	0.77	0.78	1.40
Grass Rockfish	--	0.00	0.10	0.10	--	0.01	0.09	0.10	0.20
Kelp Rockfish	--	--	0.02	0.02	--	--	0.04	0.04	0.06
Nearshore Rockfish Unid	--	--	0.01	0.01	--	--	--	--	0.01
Olive Rockfish	--	--	0.00	0.00	0.02	--	--	0.02	0.02
Quillback Rockfish	--	--	0.49	0.49	--	--	--	--	0.49
Treefish Rockfish	--	0.00	0.00	0.00	--	0.04	--	0.04	0.05
Minor shelf rockfish (North of 40°10' N. lat.)									
Bocaccio Rockfish	0.07	--	0.59	0.66	--	--	0.01	0.01	0.68
Chilipepper Rockfish	0.12	--	0.38	0.50	--	--	0.05	0.05	0.55
Cowcod Rockfish	0.02	--	--	0.02	--	--	--	--	0.02
Flag Rockfish	--	--	0.08	0.08	--	--	--	--	0.08
Green-spotted Rockfish	0.01	--	--	0.01	--	--	0.00	0.00	0.01
Green-striped Rockfish	0.82	--	0.17	0.99	0.19	--	0.02	0.20	1.20
Redstripe Rockfish	0.05	--	--	0.05	--	--	--	--	0.05
Rosethorn Rockfish	0.34	0.00	0.10	0.43	0.04	0.00	0.01	0.06	0.49

‡Mortality rates provided by the Groundfish Management Team (GMT).

**Table 9a (continued).**

	Limited Entry - Coastwide				Open Access - Coastwide				LE & OA Coastwide
	Longline Discard	Pot Discard	Landed	LE Total	Longline Discard	Pot Discard	Landed	OA Total	
Rosy Rockfish	--	--	0.00	0.00	--	--	0.00	0.00	0.00
Shelf Rockfish Unid	--	--	0.16	0.16	0.13	--	0.29	0.41	0.57
Silvergray Rockfish	0.65	--	0.61	1.25	--	--	0.09	0.09	1.34
Tiger Rockfish	--	--	--	--	--	--	0.01	0.01	0.01
Vermilion Rockfish	--	--	0.13	0.13	--	--	0.14	0.14	0.27
Minor shelf rockfish (South of 40°10' N. lat.)									
Flag Rockfish	--	--	0.05	0.05	--	--	0.09	0.09	0.14
Greenblotched Rockfish	0.00	--	0.03	0.03	--	--	0.02	0.02	0.05
Greenspotted Rockfish	--	--	0.53	0.53	--	--	1.05	1.05	1.58
Greenstriped Rockfish	--	--	0.03	0.03	0.01	--	0.10	0.11	0.14
Honeycomb Rockfish	--	--	--	--	--	--	0.00	0.00	0.00
Mexican Rockfish	--	--	0.03	0.03	--	--	0.71	0.71	0.74
Pink Rockfish	--	--	--	--	--	--	0.21	0.21	0.21
Rosethorn Rockfish	--	--	0.08	0.08	--	--	0.01	0.01	0.09
Rosy Rockfish	--	--	0.03	0.03	0.01	--	0.03	0.04	0.08
Shelf Rockfish Unid	--	--	0.07	0.07	--	--	0.70	0.70	0.77
Speckled Rockfish	--	--	0.22	0.22	--	--	0.08	0.08	0.30
Squarespot Rockfish	--	--	0.04	0.04	--	--	0.03	0.03	0.08
Starry Rockfish	--	--	0.39	0.39	--	--	0.32	0.32	0.71
Vermilion Rockfish	--	--	15.91	15.91	--	--	17.64	17.64	33.55
Yellowtail Rockfish	--	--	0.27	0.27	0.01	--	2.41	2.42	2.69
Minor slope rockfish (North of 40°10' N. lat.)									
Aurora Rockfish	0.03	--	0.07	0.10	--	--	0.01	0.01	0.12
Bank Rockfish	0.01	--	0.00	0.01	--	--	--	--	0.01
Blackgill Rockfish	0.59	--	3.07	3.66	--	--	0.14	0.14	3.80
Redbanded Rockfish	7.41	0.00	16.13	23.54	1.10	0.01	1.91	3.02	26.57
Rougheye/Blackspotted Rockfish	11.33	0.02	28.63	39.98	19.08	--	1.90	20.98	60.96
Sharpchin Rockfish	0.01	--	0.00	0.01	--	--	--	--	0.01
Shortraker Rockfish	1.74	--	2.13	3.87	--	--	0.10	0.10	3.97
Shortraker/Rougheye/Blackspotted Rockfish	0.79	--	--	0.79	0.11	--	--	0.11	0.90
Slope Rockfish Unid	0.02	0.00	1.54	1.56	--	--	0.17	0.17	1.74
Splitnose Rockfish	--	--	0.05	0.05	0.04	--	0.01	0.04	0.09
Yellowmouth Rockfish	--	--	1.81	1.81	--	--	0.01	0.01	1.83
Minor slope rockfish (South of 40°10' N. lat.)									
Aurora Rockfish	0.03	0.00	0.69	0.72	--	0.00	0.01	0.02	0.74
Bank Rockfish	--	--	0.25	0.25	--	--	0.07	0.07	0.32
Blackgill Rockfish	0.11	0.01	24.32	24.43	0.24	0.11	1.75	2.09	26.53
Redbanded Rockfish	0.05	0.01	0.05	0.11	--	0.09	0.07	0.16	0.27
Rougheye/Blackspotted Rockfish	0.06	--	0.01	0.07	--	--	--	--	0.07
Shortraker Rockfish	--	--	0.01	0.01	--	--	--	--	0.01
Shortraker/Rougheye/Blackspotted Rockfish	0.28	--	--	0.28	--	--	--	--	0.28
Slope Rockfish Unid	--	0.01	2.94	2.95	--	--	0.26	0.26	3.21
Mixed thornyheads									
Shortspine/Longspine Thornyhead	0.49	0.00	0.28	0.77	0.04	--	0.89	0.93	1.70
Other flatfish									
Curlfin Sole	--	--	--	--	--	--	0.03	0.03	0.03
Flatfish Unid	--	--	0.02	0.02	--	--	0.01	0.01	0.04
Pacific Sanddab	0.01	--	2.20	2.21	--	--	0.59	0.59	2.79
Rock Sole	--	--	0.00	0.00	--	--	0.04	0.04	0.04
Sand Sole	--	--	0.00	0.00	--	--	0.02	0.02	0.02
Sanddab Unid	--	--	1.65	1.65	--	--	1.98	1.98	3.63
Other groundfish									
Kelp Greenling (California)	--	--	0.59	0.59	0.01	--	0.29	0.30	0.88
Kelp Greenling (Oregon)	--	--	--	--	--	--	0.02	0.02	0.02
Leopard Shark	--	--	--	--	--	--	0.56	0.56	0.56
Other rockfish									
Rockfish Unid	--	--	--	--	--	--	0.16	0.16	0.16
Pacific cod									
Pacific Cod	0.21	--	1.68	1.89	--	--	0.02	0.02	1.92
Pacific hake	1.16	--	0.22	1.38	0.31	--	0.04	0.34	1.72
Pacific ocean perch (North of 40°10' N. lat.)	0.08	--	0.18	0.27	--	--	0.02	0.02	0.28
Petrale sole	0.23	0.00	0.94	1.17	0.10	0.02	0.73	0.85	2.03
Sablefish (North of 36° N. lat.)	217.47	56.72	1,656.39	1,711.23	58.41	37.81	396.63	415.88	2,127.11
20% discard mortality (Fixed Gear)‡	43.49	11.34			11.68	7.56			
Sablefish (South of 36° N. lat.)	19.49	--	307.78	311.68	--	0.00	25.02	25.02	336.70
20% discard mortality (Fixed Gear)‡	3.90					0.00			
Shortspine thornyhead (North of 34°27' N. lat.)	3.85	0.02	55.75	59.61	1.20	0.07	0.06	1.32	60.93
Shortspine thornyhead (South of 34°27' N. lat.)	3.33	--	135.98	139.30	0.43	--	0.47	0.90	140.20
Spiny dogfish	107.69	0.03	1.27	55.15	22.36	--	1.68	12.86	68.01
50% discard mortality (Line)‡	53.84				11.18				
Splitnose rockfish (South of 40°10' N. lat.)	--	--	0.03	0.03	--	--	0.04	0.04	0.08



**Table 9a (continued).**

	Limited Entry - Coastwide				Open Access - Coastwide				LE & OA Coastwide
	Longline Discard	Pot Discard	Landed	LE Total	Longline Discard	Pot Discard	Landed	OA Total	
Starry flounder	--	--	--	--	--	--	0.04	0.04	0.04
Widow rockfish	0.10	--	0.99	1.08	--	--	0.46	0.46	1.55
YELLOWEYE ROCKFISH	0.83	0.01	--	0.83	1.38	--	0.07	1.45	2.29
Yellowtail rockfish (North of 40°10' N. lat.)	0.34	--	0.51	0.85	0.10	--	0.18	0.28	1.13
<b>Non-groundfish species</b>									
California halibut	--	--	0.16	0.16	--	--	1.46	1.46	1.63
Dungeness crab	0.02	0.38	0.25	0.65	0.01	0.25	3.66	3.93	4.57
Non-FMP flatfish									
Deepsea Sole	0.00	0.02	--	0.02	--	0.00	--	0.00	0.03
Other nongroundfish									
California Sheephead	--	0.22	0.10	0.32	--	3.19	--	3.19	3.51
Sculpin Unid	0.00	--	--	0.00	--	--	--	--	0.00
Skate Unid	3.93	--	0.53	4.46	0.39	--	0.22	0.61	5.07
Squid Unid	--	--	0.02	0.02	--	--	--	--	0.02
Shared ecosystem component species									
Smelt Unid	--	--	0.03	0.03	--	--	0.02	0.02	0.05

**Table 9b. Pacific Halibut Derby.**

Observed discard ratios, SE, CV, estimated discard (mt), landings (mt), and fishing mortality estimates (mt) of groundfish species in the Pacific halibut derby fishery. Ratios are computed as the observed discard weight divided by the observed weight of retained Pacific halibut (adjusted to fish tickets). Discard ratios were multiplied by fleet landings of Pacific halibut to generate estimated discard.

Pacific Halibut Derby Fishery	Expansion factor: Fleet landings of Pacific halibut (mt)					
	Observed vessels		Observed trips	Observed tows		
	13		22	62	137	
Weight (mt)	Discard Ratio	SE	CV	Discard	Landed	Total Estimate
<b>Groundfish species</b>						
Arrowtooth flounder	0.1120	0.0276	0.2466	15.35	0.89	16.24
Big skate	0.0013	0.0002	0.1558	0.18	0.72	0.91
Canary rockfish	0.0001	0.0000	0.1558	0.02	0.22	0.24
Darkblotched rockfish	0.0046	0.0015	0.3367	0.63	0.06	0.69
Dover sole	0.0013	0.0003	0.2517	0.17	0.04	0.22
Ecosystem component species						
Sandpaper Skate	0.0009	0.0004	0.4009	0.13	--	0.13
Spotted Ratfish	0.0014	0.0004	0.2522	0.20	--	0.20
Lingcod (North of 40°10' N. lat.)	0.0015	0.0004	0.2638	0.20	1.45	1.46
7% discard mortality (Line)‡				0.01		
Longnose skate	0.0587	0.0140	0.2394	8.04	3.04	7.06
50% discard mortality (Fixed Gear)‡				4.02		
Minor shelf rockfish (North of 40°10' N. lat.)						
Bocaccio Rockfish	--	--	--	--	0.05	0.05
Chilipepper Rockfish	--	--	--	--	0.00	0.00
Greenstriped Rockfish	0.0004	0.0001	0.2679	0.05	0.00	0.06
Rosethorn Rockfish	0.0001	0.0000	0.2004	0.01	0.02	0.03
Silvergray Rockfish	--	--	--	--	0.18	0.18
Vermilion Rockfish	--	--	--	--	0.01	0.01
Minor slope rockfish (North of 40°10' N. lat.)						
Aurora Rockfish	--	--	--	--	0.00	0.00
Blackgill Rockfish	--	--	--	--	0.00	0.00
Redbanded Rockfish	0.0004	0.0001	0.3303	0.06	0.30	0.36
Rougheye/Blackspotted Rockfish	0.0253	0.0105	0.4137	3.47	1.20	4.67
Shortraker Rockfish	0.0009	0.0003	0.3824	0.12	0.05	0.18
Shortraker/Rougheye/Blackspotted Rockfish	0.0126	0.0049	0.3883	1.73	--	1.73
Slope Rockfish Unid	0.0002	0.0000	0.1558	0.03	0.07	0.10
Splitnose Rockfish	--	--	--	--	0.00	0.00
Yellowmouth Rockfish	0.0001	0.0000	0.1558	0.02	0.02	0.04
Pacific cod	--	--	--	--	0.05	0.05
Pacific hake	0.0021	0.0011	0.5048	0.29	0.03	0.32
Pacific ocean perch (North of 40°10' N. lat.)	0.00	0.00	0.2018	0.02	0.02	0.04
Petrale sole	0.0012	0.0005	0.3658	0.17	0.07	0.25
Sablefish (North of 36° N. lat.)	0.3600	0.1562	0.4340	49.34	32.65	42.52
20% discard mortality (Fixed Gear)‡				9.87		
Shortspine thornyhead (North of 34°27' N. lat.)	0.0054	0.0013	0.2334	0.75	0.13	0.87
Spiny dogfish	0.0027	0.0010	0.3612	0.37	0.03	0.22
50% discard mortality (Line)‡				0.19		
Widow rockfish	0.0002	0.0000	0.1558	0.02	0.01	0.03
YELLOW EYE ROCKFISH	0.0049	0.0008	0.1558	0.68	--	0.68
Yellowtail rockfish (North of 40°10' N. lat.)	0.0003	0.0001	0.2177	0.04	0.04	0.08
<b>Non-groundfish species</b>						
Dungeness crab	0.0002	0.0000	0.2163	0.02	--	0.02
Other nongroundfish						
Skate Unid	0.0197	0.0055	0.2770	2.70	0.66	3.36

**Table 10. Nearshore Fixed Gear: Partition Landings by Depth.**

Commercial landings of nearshore species (mt) in Oregon and California during 2017, partitioned by depth interval and groundfish management area based on observed catch from 2003 to 2017. Data from both states were combined. The California state-permit framework, which groups nearshore rockfish into either shallow or deeper nearshore rockfish, is represented in the area south of 40°10' N. latitude.

	2003-2017 Total observed landings (mt)	2003-2017 Percentage of observed catch by depth (fathoms)				2017 Fleet landings (mt)	2017 Fleet landings (mt) reallocated by depth (fathoms)			
		0 - 10	10-20	20-30	> 30		0 - 10	10-20	20-30	> 30
NORTH of 40° 10' N Lat.										
Nearshore Species - Commercial										
Black rockfish (California)	78.86	40.9%	56.5%	2.4%	0.3%	38.98	15.94	22.02	0.92	0.10
Black rockfish (Oregon)	131.01	46.0%	51.4%	2.2%	0.5%	106.61	49.00	54.77	2.33	0.50
Cabezon (California)	2.72	37.7%	53.8%	8.5%	0.1%	0.81	0.31	0.44	0.07	0.00
Cabezon (Oregon)	29.68	31.1%	64.8%	3.4%	0.7%	25.14	7.82	16.29	0.86	0.17
Lingcod (North of 40°10' N. lat.)	49.89	29.1%	62.1%	8.4%	0.4%	55.05	16.04	34.20	4.60	0.21
Minor nearshore rockfish (North of 40°10' N. lat.)										
Black and Yellow Rockfish	0.07	33.6%	66.4%	--	--	0.01	0.00	0.01	--	--
Blue/Deacon Rockfish	18.92	20.8%	69.7%	9.1%	0.4%	9.07	1.89	6.32	0.82	0.04
Brown Rockfish	0.31	10.6%	33.2%	56.2%	--	0.04	0.00	0.01	0.02	--
China Rockfish	7.76	28.8%	65.1%	5.7%	0.4%	3.92	1.13	2.55	0.23	0.01
Copper Rockfish	2.08	12.3%	69.4%	18.3%	0.0%	2.92	0.36	2.03	0.53	0.00
Gopher Rockfish	0.07	36.8%	59.2%	4.0%	--	0.03	0.01	0.02	0.00	--
Grass Rockfish	0.49	88.7%	10.5%	0.6%	0.1%	0.10	0.09	0.01	0.00	0.00
Olive Rockfish	0.20	17.8%	63.9%	17.0%	1.4%	0.08	0.01	0.05	0.01	0.00
Quillback Rockfish	3.02	9.9%	63.0%	26.6%	0.6%	2.81	0.28	1.77	0.75	0.02
Other groundfish										
Kelp Greenling (California)	0.80	30.9%	68.1%	0.5%	0.5%	0.26	0.08	0.18	0.00	0.00
Kelp Greenling (Oregon)	18.02	47.5%	50.7%	1.3%	0.6%	8.21	3.90	4.16	0.11	0.05
SOUTH of 40° 10' N Lat.										
Nearshore Species - Commercial										
Black rockfish (California)	2.21	48.7%	49.0%	1.7%	0.6%	2.69	1.31	1.32	0.05	0.02
Cabezon (California)	8.04	87.6%	11.1%	0.3%	1.0%	20.04	17.56	2.23	0.05	0.20
California scorpionfish (South of 34°27' N. lat.)	0.63	2.9%	1.0%	30.8%	65.2%	0.08	0.00	0.00	0.02	0.05
Deeper nearshore rockfish										
Blue/Deacon Rockfish	1.69	33.8%	53.3%	10.0%	2.9%	7.53	2.55	4.01	0.75	0.22
Brown Rockfish	13.09	22.6%	66.4%	10.2%	0.8%	17.84	4.03	11.85	1.81	0.14
Copper Rockfish	0.99	12.5%	57.2%	21.3%	9.0%	7.10	0.89	4.07	1.51	0.64
Nearshore Rockfish Unid	0.57	34.1%	22.7%	29.2%	14.0%	0.20	0.07	0.04	0.06	0.03
Olive Rockfish	0.58	20.8%	57.1%	21.1%	1.0%	0.23	0.05	0.13	0.05	0.00
Quillback Rockfish	0.16	--	45.6%	53.2%	1.1%	0.32	--	0.15	0.17	0.00
Treefish Rockfish	0.32	39.3%	54.4%	2.4%	4.0%	2.31	0.91	1.26	0.05	0.09
Lingcod (South of 40°10' N. lat.)	9.82	34.0%	56.1%	9.1%	0.8%	22.57	7.66	12.66	2.06	0.18
Other groundfish										
Kelp Greenling (California)	1.58	50.0%	47.7%	1.5%	0.8%	3.26	1.63	1.55	0.05	0.02
Other rockfish										
Rockfish Unid	0.10	34.3%	28.3%	--	37.3%	0.27	0.09	0.08	--	0.10
Shallow nearshore rockfish										
Black and Yellow Rockfish	2.49	85.8%	12.2%	0.3%	1.7%	12.87	11.04	1.57	0.04	0.22
China Rockfish	0.72	28.3%	51.4%	19.6%	0.7%	1.25	0.35	0.64	0.25	0.01
Gopher Rockfish	7.30	46.8%	45.9%	6.6%	0.8%	25.42	11.89	11.66	1.67	0.20
Grass Rockfish	1.04	96.5%	3.0%	0.3%	0.2%	10.42	10.06	0.31	0.03	0.02
Kelp Rockfish	0.21	64.8%	34.5%	0.5%	0.2%	0.68	0.44	0.24	0.00	0.00
Nearshore Rockfish Unid	0.27	61.7%	29.8%	1.7%	6.8%	0.00	0.00	0.00	0.00	0.00
Other nongroundfish										
California Sheephead	22.02	67.8%	30.3%	1.6%	0.3%	19.90	13.49	6.02	0.33	0.05

**Table 11. Nearshore Fixed Gear: Discard Estimate CVs.**

Observed discard CVs from the commercial nearshore fixed gear fishery by groundfish management area and depth. Because the strata at which discard ratios, estimates, and mortality rates applied were confidential, we report CVs at the finest possible level of aggregated state and depth strata. Aggregated mortality estimates are reported in Tables 12a and 12b. The California state-permit framework is represented in the area south of 40°10' N. latitude.

	North of 40°10' N Lat.									South of 40°10' N Lat.											
	0 - 10 fm			10 - 20 fm			> 20 fm			0 - 10 fm			10 - 20 fm			20 - 30 fm			> 30 fm		
Nearshore Fixed Gear Fishery	Vessels	Trips	Sets	Vessels	Trips	Sets	Vessels	Trips	Sets	Vessels	Trips	Sets	Vessels	Trips	Sets	Vessels	Trips	Sets	Vessels	Trips	Sets
	41	80	92	47	132	159	16	26	27	17	20	25	20	62	69	5	6	6	6	12	19
	97			145			12			101			60			9			2		
Observed																					
Expansion factor:																					
Fleet landings of nearshore species (mt)																					
Groundfish species																					
Big skate			--			--			--			--			0.1342			--			--
Black rockfish (California)			0.4406			0.4077			0.1222			0.3903			0.2503			--			--
Black rockfish (Oregon)			0.2495			0.2230			0.3721			--			--			--			--
Cabezon (California)			--			0.0642			--			0.6296			0.3104			--			--
Cabezon (Oregon)			0.2088			0.2674			0.2983			--			--			--			--
California scorpionfish (South of 34°27' N. lat.)			--			--			--			0.1976			0.1342			--			0.6284
Canary rockfish			0.2183			0.2486			0.3562			0.1976			0.4543			--			0.4182
Deeper nearshore rockfish																					
Blue/Deacon Rockfish			--			--			--			0.3973			0.3623			0.5443			--
Brown Rockfish			--			--			--			0.3530			0.2174			--			0.4335
Calico Rockfish			--			--			--			0.1976			0.3515			--			--
Copper Rockfish			--			--			--			0.4034			0.3217			0.4281			0.3362
Olive Rockfish			--			--			--			0.3888			0.5034			--			--
Treefish Rockfish			--			--			--			0.3363			0.2427			0.4281			--
Ecosystem component species																					
California Skate			--			--			--			--			--			--			0.4488
Soupin Shark			--			--			--			--			--			--			0.6134
Spotted Ratfish			--			--			0.4998			--			--			--			0.4411
English sole			--			--			--			--			--			--			0.3362
Lingcod (North of 40°10' N. lat.)			0.2277			0.1763			0.6189			--			--			--			--
Lingcod (South of 40°10' N. lat.)			--			--			--			0.3105			0.2067			0.5297			0.4078
Minor nearshore rockfish (North of 40°10' N. lat.)																					
Blue/Deacon Rockfish			0.2295			0.1736			0.3924			--			--			--			--
China Rockfish			0.3394			0.1602			0.3872			--			--			--			--
Copper Rockfish			--			0.2750			0.4003			--			--			--			--
Gopher Rockfish			--			0.0642			--			--			--			--			--
Olive Rockfish			--			0.0642			--			--			--			--			--
Quillback Rockfish			0.3021			0.1592			0.4293			--			--			--			--
Minor shelf rockfish (North of 40°10' N. lat.)																					
Rosethorn Rockfish			--			0.0642			--			--			--			--			--
Rosy Rockfish			--			0.0642			0.4678			--			--			--			--
Vermilion Rockfish			0.0786			0.5118			0.4165			--			--			--			--

**Table 11 (continued).**

	North of 40°10' N Lat.									South of 40°10' N Lat.								
	0 - 10 fm			10 - 20 fm			> 20 fm			0 - 10 fm			10 - 20 fm			20 - 30 fm		
	Vessels	Trips	Sets	Vessels	Trips	Sets	Vessels	Trips	Sets	Vessels	Trips	Sets	Vessels	Trips	Sets	Vessels	Trips	Sets
<b>Nearshore Fixed Gear Fishery</b>	41	80	92	47	132	159	16	26	27	17	20	25	20	62	69	5	6	6
Observed																		
Expansion factor:	97			145			12			101			60			9		
Fleet landings of nearshore species (mt)																		
Minor shelf rockfish (South of 40°10' N. lat.)																		
Bronzespotted Rockfish			--			--			--			--	0.1342		--			--
Flag Rockfish			--			--			--			--			--			0.3931
Freckled Rockfish			--			--			--			--			--			0.3362
Greenspotted Rockfish			--			--			--			--			--			0.3362
Greenstriped Rockfish			--			--			--			--			--			0.3362
Halfbanded Rockfish			--			--			--			--			--			0.5167
Honeycomb Rockfish			--			--			--			--	0.1342		--			0.4089
Mexican Rockfish			--			--			--			--			--			0.3362
Rosethorn Rockfish			--			--			--		0.1976	--			--			--
Rosy Rockfish			--			--			--			--	0.1342		0.4281			0.3362
Squarespot Rockfish			--			--			--			--			0.4281			--
Starry Rockfish			--			--			--			--	0.1342		--			0.3362
Swordspine Rockfish			--			--			--			--			--			0.3362
Vermilion Rockfish			--			--			--			--	0.3716		--			--
Yellowtail Rockfish			--			--			--		0.1976	--	0.274		0.4281			0.6243
Other flatfish																		
Pacific Sanddab			--			--			--			--	0.1342		0.4281			0.4666
Rock Sole			--		0.0642	--			--			--	0.2956		--			--
Sand Sole		0.0786	--			--			--			--			--			--
Other groundfish																		
Kelp Greenling (California)			--		0.4367	--			--		0.1976	--	0.2997		0.4281			--
Kelp Greenling (Oregon)		0.1854	--		0.2169	--		0.3218	--		--	--			--			--
Shallow nearshore rockfish																		
Black and Yellow Rockfish			--			--			--		0.4736	--	0.3679		--			--
China Rockfish			--			--			--		0.4031	--	0.2418		0.735			0.6353
Gopher Rockfish			--			--			--		0.3432	--	0.2244		0.5401			0.3987
Grass Rockfish			--			--			--		0.1976	--			--			--
Kelp Rockfish			--			--			--		0.4125	--			--			--
Spiny dogfish			--			--			--			--	0.3445		--			0.489
Widow rockfish		0.0786	--		0.3200	--		0.4367	--			--			0.4281			0.3362
YELLOWWEYE ROCKFISH		0.2657	--		0.1642	--		0.3206	--			--	0.1342		0.4281			--
Yellowtail rockfish (North of 40°10' N. lat.)		0.4653	--		0.1717	--		0.2593	--			--			--			--
<b>Non-groundfish species</b>																		
Dungeness crab			--		0.5880	--			--		0.1976	--	0.2948		--			--
Other nongroundfish																		
Brown Irish Lord Sculpin			--		0.0642	--			--			--	0.3716		--			--
Buffalo Sculpin		0.3245	--		0.6283	--			--			--			--			--
California Sheephead			--			--			--		0.3444	--	0.3663		--			0.3362
Red Irish Lord Sculpin		0.1913	--		0.2094	--		0.3822	--			--			--			--
Sculpin Unid			--		0.5718	--		0.5754	--		0.1976	--	0.3456		--			--
Starry Skate			--			--			--			--			--			0.3362
Shared ecosystem component species																		
Pacific Saury			--			--			--			--	0.1342		--			--

Some listed species are under state nearshore fixed gear management, but not included in the groundfish FMP.

**Table 12a. Nearshore Fixed Gear: Fishing Mortality Estimates, North of 40°10' N. latitude.**

Gross estimated discard (mt), estimated discard mortality (mt), fleet landings (mt), and fishing mortality estimates (mt) at non-confidential depth strata for the commercial nearshore fixed gear fishery north of 40°10' N. latitude. Mortality rates applied (at finer, confidential strata) are reported in Table A-4.

Nearshore Fixed Gear Fishery North of 40°10' N lat.	Gross estimated discard (mt) by depth (fm)			Estimated discard mortality (mt) by depth (fm)			Estimated discard mortality (mt)	Fleet Landings (mt)	Estimated fishing mortality (mt)
	0-10	10-20	> 20	0-10	10-20	> 20			
<b>Groundfish species</b>									
Big skate	--	--	--	--	--	--	--	0.06	0.06
Black rockfish (California)	0.59	0.33	0.00	0.11	0.09	0.00	0.20	38.98	39.18
Black rockfish (Oregon)	3.96	3.09	0.10	0.71	0.87	0.05	1.63	106.61	108.23
Cabazon (California)	--	0.02	--	--	0.00	--	0.00	0.81	0.81
Cabazon (Oregon)	0.51	0.78	0.02	0.04	0.05	0.00	0.09	25.14	25.23
Canary rockfish	0.14	0.47	0.06	0.04	0.20	0.04	0.28	2.87	3.15
Ecosystem component species									
Southern Shark	--	--	--	--	--	--	--	0.02	0.02
Spotted Ratfish	--	--	0.02	--	--	0.00	0.00	--	0.00
Lingcod (North of 40°10' N. lat.)	10.63	15.18	1.07	0.74	1.06	0.07	1.88	55.05	56.94
Longnose skate	--	--	--	--	--	--	--	0.02	0.02
Minor nearshore rockfish (North of 40°10' N. lat.)									
Black and Yellow Rockfish	--	--	--	--	--	--	--	0.01	0.01
Blue/Deacon Rockfish	2.06	3.78	0.32	0.52	1.40	0.18	2.10	9.07	11.16
Brown Rockfish	--	--	--	--	--	--	--	0.04	0.04
China Rockfish	0.21	0.68	0.02	0.04	0.21	0.01	0.26	3.92	4.19
Copper Rockfish	--	0.09	0.01	--	0.03	0.01	0.04	2.92	2.96
Gopher Rockfish	--	0.00	--	--	0.00	--	0.00	0.03	0.03
Grass Rockfish	--	--	--	--	--	--	--	0.10	0.10
Olive Rockfish	--	0.00	--	--	0.00	--	0.00	0.08	0.08
Quillback Rockfish	0.08	0.36	0.02	0.02	0.15	0.01	0.18	2.81	2.99
Minor shelf rockfish (North of 40°10' N. lat.)									
Bocaccio Rockfish	--	--	--	--	--	--	--	0.00	0.00
Greenspotted Rockfish	--	--	--	--	--	--	--	0.01	0.01
Greenstriped Rockfish	--	--	--	--	--	--	--	0.00	0.00
Rosethorn Rockfish	--	0.01	--	--	0.01	--	0.01	--	0.01
Rosy Rockfish	--	0.02	0.02	--	0.02	0.02	0.03	0.00	0.03
Shelf Rockfish Unid	--	--	--	--	--	--	--	0.07	0.07
Tiger Rockfish	--	--	--	--	--	--	--	0.25	0.25
Vermilion Rockfish	0.00	0.18	0.05	0.00	0.07	0.03	0.10	3.91	4.02
Minor slope rockfish (North of 40°10' N. lat.)									
Slope Rockfish Unid	--	--	--	--	--	--	--	0.00	0.00
Other flatfish									
Pacific Sanddab	--	--	--	--	--	--	--	0.00	0.00
Rock Sole	--	0.00	--	--	0.00	--	0.00	0.00	0.00
Sand Sole	0.01	--	--	0.00	--	--	0.00	0.00	0.00
Sanddab Unid	--	--	--	--	--	--	--	0.00	0.00
Other groundfish									
Kelp Greenling (California)	--	0.00	--	--	0.00	--	0.00	0.26	0.26
Kelp Greenling (Oregon)	0.17	0.25	0.02	0.01	0.02	0.00	0.03	8.21	8.24
Petrale sole	--	--	--	--	--	--	--	0.00	0.00
Sablefish (North of 36° N. lat.)	--	--	--	--	--	--	--	0.10	0.10
Spiny dogfish	--	--	--	--	--	--	--	0.05	0.05
Starry flounder	--	--	--	--	--	--	--	0.00	0.00
Widow rockfish	0.01	0.00	0.03	0.00	0.00	0.02	0.03	0.16	0.18
YELLOW EYE ROCKFISH	0.18	2.81	1.04	0.05	1.27	0.70	2.02	0.00	2.02
Yellowtail rockfish (North of 40°10' N. lat.)	0.31	0.43	0.02	0.05	0.11	0.01	0.17	1.11	1.28
<b>Non-groundfish species</b>									
Dungeness crab	--	0.00	--	--	0.00	--	0.00	1.17	1.17
Other nongroundfish									
Brown Irish Lord Sculpin	--	0.00	--	--	0.00	--	0.00	--	0.00
Buffalo Sculpin	0.02	0.15	--	0.02	0.15	--	0.17	--	0.17
Red Irish Lord Sculpin	0.05	0.07	0.00	0.05	0.07	0.00	0.12	--	0.12
Sculpin Unid	--	0.01	0.00	--	0.01	0.00	0.01	--	0.01
Skate Unid	--	--	--	--	--	--	--	0.10	0.10

Some listed species are under state nearshore fixed gear management, but not included in the groundfish FMP.

**Table 12b. Nearshore Fixed Gear: Fishing Mortality Estimates, South of 40°10' N. latitude.**

Gross estimated discard (mt), estimated discard mortality (mt), fleet landings (mt), and fishing mortality estimates (mt) at non-confidential depth strata for the commercial nearshore fixed gear fishery south of 40°10' N. latitude. The California state-permit framework is also represented. Mortality rates applied (at finer, confidential strata) are reported in Table A-4.

Nearshore Fixed Gear Fishery South of 40°10' N lat	Gross estimated discard (mt) by depth (fm)				Estimated discard mortality (mt) by depth (fm)				Estimated discard mortality (mt)	Fleet Landings (mt)	Estimated fishing mortality (mt)
	0-10	10-20	20-30	>30	0-10	10-20	20-30	>30			
<b>Groundfish species</b>											
Big skate	--	0.43	--	--	--	0.03	--	--	0.03	--	0.03
Black rockfish (California)	0.19	0.11	--	--	0.10	0.07	--	--	0.17	2.69	2.86
Bocaccio rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	0.77	0.77
Cabezon (California)	1.52	0.81	--	--	0.11	0.06	--	--	0.16	20.04	20.20
California scorpionfish (North of 34°27' N. lat.)	--	--	--	--	--	--	--	--	--	0.01	0.01
California scorpionfish (South of 34°27' N. lat.)	0.04	0.06	--	0.39	0.00	0.00	--	0.03	0.03	0.08	0.11
Canary rockfish	0.01	2.27	--	0.43	0.01	1.61	--	0.43	2.05	1.66	3.70
Chilipepper rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	0.01	0.01
Deeper nearshore rockfish											
Blue/Deacon Rockfish	0.58	0.71	0.15	--	0.33	0.48	0.11	--	0.92	7.53	8.45
Brown Rockfish	0.22	1.71	--	0.10	0.12	1.09	--	0.10	1.32	17.84	19.16
Calico Rockfish	0.00	0.00	--	--	0.00	0.00	--	--	0.01	--	0.01
Copper Rockfish	0.02	0.06	0.08	0.04	0.01	0.04	0.06	0.04	0.15	7.10	7.26
Nearshore Rockfish Unid	--	--	--	--	--	--	--	--	--	0.20	0.20
Olive Rockfish	0.11	0.01	--	--	0.07	0.01	--	--	0.08	0.23	0.31
Quillback Rockfish	--	--	--	--	--	--	--	--	--	0.32	0.32
Treefish Rockfish	0.30	0.32	0.03	--	0.16	0.21	0.02	--	0.40	2.31	2.71
<b>Ecosystem component species</b>											
California Skate	--	--	--	0.03	--	--	--	0.00	0.00	--	0.00
Soupfin Shark	--	--	--	0.05	--	--	--	0.00	0.00	0.65	0.65
Spotted Ratfish	--	--	--	0.08	--	--	--	0.01	0.01	0.00	0.01
English sole	--	--	--	0.00	--	--	--	0.00	0.00	0.00	0.00
Lingcod (South of 40°10' N. lat.)	0.99	10.07	2.03	0.24	0.07	0.70	0.14	0.02	0.93	22.57	23.50
Longspine thornyhead (North of 34°27' N. lat.)	--	--	--	--	--	--	--	--	--	0.47	0.47
Minor shelf rockfish (South of 40°10' N. lat.)											
Bronzespotted Rockfish	--	0.10	--	--	--	0.10	--	--	0.10	--	0.10
Flag Rockfish	--	--	--	0.00	--	--	--	0.00	0.00	0.04	0.04
Freckled Rockfish	--	--	--	0.01	--	--	--	0.01	0.01	--	0.01
Greenspotted Rockfish	--	--	--	0.02	--	--	--	0.02	0.02	0.11	0.13
Greenstriped Rockfish	--	--	--	0.00	--	--	--	0.00	0.00	0.00	0.00
Halfbanded Rockfish	--	--	--	0.03	--	--	--	0.03	0.03	--	0.03
Honeycomb Rockfish	--	0.00	--	0.01	--	0.00	--	0.01	0.01	0.00	0.01
Mexican Rockfish	--	--	--	0.00	--	--	--	0.00	0.00	0.07	0.07
Pink Rockfish	--	--	--	--	--	--	--	--	--	0.03	0.03
Rosethorn Rockfish	0.00	--	--	--	0.00	--	--	--	0.00	0.05	0.06
Rosy Rockfish	--	0.01	0.01	0.00	--	0.01	0.01	0.00	0.02	0.09	0.11
Shelf Rockfish Unid	--	--	--	--	--	--	--	--	--	0.35	0.35
Speckled Rockfish	--	--	--	--	--	--	--	--	--	0.13	0.13
Squarespot Rockfish	--	--	0.01	--	--	--	0.01	--	0.01	0.02	0.03
Starry Rockfish	--	0.02	--	0.00	--	0.02	--	0.00	0.02	0.30	0.32
Swordspine Rockfish	--	--	--	0.00	--	--	--	0.00	0.00	--	0.00
Vermilion Rockfish	--	0.02	--	--	--	0.01	--	--	0.01	10.98	10.99
Yellowtail Rockfish	0.01	0.04	0.24	0.02	0.00	0.03	0.16	0.02	0.21	0.64	0.85
<b>Minor slope rockfish (South of 40°10' N. lat.)</b>											
Aurora Rockfish	--	--	--	--	--	--	--	--	--	0.01	0.01
Bank Rockfish	--	--	--	--	--	--	--	--	--	0.02	0.02
Blackgill Rockfish	--	--	--	--	--	--	--	--	--	0.93	0.93
Slope Rockfish Unid	--	--	--	--	--	--	--	--	--	0.06	0.06
<b>Mixed thornyheads</b>											
Shortspine/Longspine Thornyhead	--	--	--	--	--	--	--	--	--	0.01	0.01
<b>Other flatfish</b>											
Curlfin Sole	--	--	--	--	--	--	--	--	--	0.00	0.00
Flatfish Unid	--	--	--	--	--	--	--	--	--	0.02	0.02
Pacific Sanddab	--	0.00	0.01	0.10	--	0.00	0.00	0.01	0.01	0.01	0.02
Rock Sole	--	0.01	--	--	--	0.00	--	--	0.00	0.03	0.03
Sand Sole	--	--	--	--	--	--	--	--	--	0.14	0.14
Sanddab Unid	--	--	--	--	--	--	--	--	--	0.14	0.14

Table 12b (continued).

Nearshore Fixed Gear Fishery South of 40°10' N lat	Gross estimated discard (mt) by depth (fm)				Estimated discard mortality (mt) by depth (fm)				Estimated discard mortality (mt)	Reef Landings (mt)	Estimated fishing mortality (mt)
	0-10	10-20	20-30	>30	0-10	10-20	20-30	>30			
Other groundfish											
Kelp Greenling (California)	0.00	0.17	0.07	--	0.00	0.01	0.00	--	0.02	3.26	3.27
Leopard Shark	--	--	--	--	--	--	--	--	--	0.41	0.41
Other rockfish											
Rockfish Unid	--	--	--	--	--	--	--	--	--	0.27	0.27
Sablefish (North of 36° N. lat.)	--	--	--	--	--	--	--	--	--	0.99	0.99
Sablefish (South of 36° N. lat.)	--	--	--	--	--	--	--	--	--	12.53	12.53
Shallow nearshore rockfish											
Black and Yellow Rockfish	0.36	0.08	--	--	0.19	0.05	--	--	0.24	12.87	13.11
China Rockfish	0.04	0.63	0.28	0.04	0.02	0.41	0.20	0.04	0.68	1.25	1.93
Gopher Rockfish	0.35	1.02	0.54	0.02	0.20	0.70	0.42	0.02	1.34	25.42	26.76
Grass Rockfish	0.05	--	--	--	0.03	--	--	--	0.03	10.42	10.45
Kelp Rockfish	0.05	--	--	--	0.03	--	--	--	0.03	0.68	0.71
Nearshore Rockfish Unid	--	--	--	--	--	--	--	--	--	0.00	0.00
Shortspine thornyhead (North of 34°27' N. lat.)	--	--	--	--	--	--	--	--	--	3.38	3.38
Shortspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	--	--	--	0.00	0.00
Spiny dogfish	--	0.70	--	0.64	--	0.05	--	0.04	0.09	0.02	0.11
Splitnose rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	0.02	0.02
Starry flounder	--	--	--	--	--	--	--	--	--	0.04	0.04
Widow rockfish	--	--	0.03	0.01	--	--	0.03	0.01	0.04	0.58	0.62
YELLOWEYE ROCKFISH	--	0.10	0.02	--	--	0.07	0.02	--	0.09	0.01	0.10
California halibut	--	--	--	--	--	--	--	--	--	0.53	0.53
<b>Non-groundfish species</b>											
Dungeness crab	0.06	0.05	--	--	0.06	0.05	--	--	0.12	0.92	1.03
Other nongroundfish											
Brown Irish Lord Sculpin	--	0.01	--	--	--	0.01	--	--	0.01	--	0.01
California Sheephead	40.93	16.12	--	0.00	40.93	16.12	--	0.00	57.05	19.90	76.95
Sculpin Unid	0.08	0.05	--	--	0.08	0.05	--	--	0.14	--	0.14
Skate Unid	--	--	--	--	--	--	--	--	--	0.01	0.01
Starry Skate	--	--	--	0.01	--	--	--	0.01	0.01	--	0.01
Shared ecosystem component species											
Pacific Saury	--	0.00	--	--	--	0.00	--	--	0.00	--	0.00

Some listed species are under state nearshore fixed gear management, but not included in the groundfish FMP.



**Table 13. Observed Sectors: Non-IFQ Fishing Mortality Estimates by Sector.**

Estimated discard (mt), landings (mt), and estimated total fishing mortality (mt) of groundfish species in non-IFQ fisheries observed by the WCGOP.

Groundfish species	Open Access CA halibut			Sea cucumber			Pink shrimp			Ridgeback prawn			Non-nearshore fixed gear			Pacific halibut derby			Nearshore fixed gear		
	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate
Arrowtooth flounder	--	--	--	--	--	--	1.13	--	1.13	0.01	--	0.01	32.53	2.57	35.10	15.35	0.89	16.24	--	--	--
Big skate	18.06	1.92	19.98	0.06	--	0.06	0.00	--	0.00	0.00	--	0.00	2.16	3.99	6.14	0.18	0.72	0.91	0.03	0.06	0.09
Black rockfish (California)	--	--	--	--	--	--	--	--	--	--	0.00	0.00	0.02	11.50	11.52	--	--	--	0.37	41.68	42.05
Black rockfish (California)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01	0.01
Black rockfish (Oregon)	--	--	--	--	--	--	--	--	--	--	--	--	--	3.15	3.15	--	--	--	1.63	106.61	108.23
Bocaccio rockfish (South of 40°10' N. lat.)	--	--	--	0.00	--	0.00	0.12	--	0.12	0.15	0.00	0.15	0.15	5.36	5.52	--	--	--	--	0.77	0.77
Cabezon (California)	0.01	--	0.01	--	--	--	--	--	--	0.01	0.00	0.02	0.64	2.17	2.82	--	--	--	0.17	20.85	21.02
Cabezon (Oregon)	--	--	--	--	--	--	--	--	--	--	--	--	--	0.15	0.15	--	--	--	0.09	25.14	25.23
California scorpionfish (North of 34°27' N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01	0.01
California scorpionfish (South of 34°27' N. lat.)	0.40	--	0.40	0.16	--	0.16	--	--	--	0.77	0.14	0.92	0.01	1.12	1.13	--	--	--	0.03	0.08	0.11
Canary rockfish	0.01	--	0.01	--	--	--	0.07	--	0.07	0.01	--	0.01	0.84	4.20	5.03	0.02	0.22	0.24	2.32	4.53	6.85
Chilipepper rockfish (South of 40°10' N. lat.)	0.01	--	0.01	0.01	--	0.01	1.07	--	1.07	0.65	--	0.65	0.11	0.91	1.02	--	--	--	--	0.01	0.01
COWCOD ROCKFISH (South of 40°10' N. lat.)	--	--	--	--	--	--	0.09	--	0.09	0.07	--	0.07	--	--	--	--	--	--	--	--	--
Darkblotched rockfish	--	--	--	0.00	--	0.00	6.05	--	6.05	0.01	--	0.01	1.03	4.50	5.54	0.63	0.06	0.69	--	--	--
Dover sole	0.00	0.00	0.00	0.05	0.00	0.05	4.56	--	4.56	10.52	0.01	10.52	2.90	3.18	6.09	0.17	0.04	0.22	--	--	--
Ecosystem component species																					
Aleutian Skate	--	--	--	--	--	--	0.00	--	0.00	--	--	--	0.08	--	0.08	--	--	--	--	--	--
Black Skate	--	--	--	--	--	--	--	--	--	--	--	--	5.38	0.01	5.40	--	--	--	--	--	--
California Grenadier	--	--	--	--	--	--	--	--	--	--	--	--	0.18	--	0.18	--	--	--	--	--	--
California Skate	19.95	0.14	20.08	1.58	--	1.58	0.03	--	0.03	1.09	--	1.09	0.12	0.01	0.12	--	--	--	0.00	--	0.00
Giant Grenadier	--	--	--	--	--	--	--	--	--	--	--	--	8.12	0.32	8.43	--	--	--	--	--	--
Grenadier Unid	--	--	--	--	--	--	--	--	--	--	--	--	3.51	18.49	22.00	--	--	--	--	--	--
Pacific Flatnose	--	--	--	--	--	--	0.00	--	0.00	--	--	--	0.40	--	0.40	--	--	--	--	--	--
Pacific Grenadier	--	--	--	--	--	--	--	--	--	--	--	--	9.07	0.66	9.73	--	--	--	--	--	--
Sandpaper Skate	0.00	--	0.00	--	--	--	0.05	--	0.05	--	--	--	2.94	--	2.94	0.13	--	0.13	--	--	--
Smooth Grenadier	--	--	--	--	--	--	--	--	--	--	--	--	0.01	--	0.01	--	--	--	--	--	--
Southern Shark	0.90	0.03	0.93	--	--	--	0.00	--	0.00	0.04	--	0.04	0.47	0.30	0.77	--	--	--	0.00	0.66	0.67
Spotted Ratfish	0.01	--	0.01	--	--	--	0.16	--	0.16	0.73	--	0.73	3.91	--	3.91	0.20	--	0.20	0.01	0.00	0.01
English sole	2.42	0.07	2.49	1.35	0.02	1.38	0.04	--	0.04	22.00	0.80	22.80	--	0.00	0.00	--	--	--	0.00	0.00	0.00
Lingcod (North of 40°10' N. lat.)	--	--	--	--	--	--	0.01	--	0.01	--	--	--	0.58	54.48	55.06	0.01	1.45	1.46	1.88	55.05	56.94
Lingcod (South of 40°10' N. lat.)	0.48	0.60	1.09	0.04	--	0.04	--	--	--	0.35	0.05	0.40	0.32	36.01	36.33	--	--	--	0.93	22.57	23.50
Longnose skate	0.22	--	0.22	0.02	--	0.02	0.49	--	0.49	0.38	0.01	0.39	59.92	46.53	106.45	4.02	3.04	7.06	--	0.02	0.02
Longspine thornyhead (North of 34°27' N. lat.)	--	--	--	--	--	--	0.00	--	0.00	--	--	--	3.37	4.06	7.43	--	--	--	--	0.47	0.47
Longspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--	0.79	11.25	12.04	--	--	--	--	--	--
Minor nearshore rockfish (North of 40°10' N. lat.)																					
Black and Yellow Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01	0.01
Blue/Deacon Rockfish	--	--	--	--	--	--	0.00	--	0.00	--	--	--	0.02	0.79	0.81	--	--	--	2.10	9.07	11.16
Brown Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.04	0.04
China Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	0.03	0.03	--	--	--	0.26	3.92	4.19
Copper Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.04	0.20	0.24	--	--	--	0.04	2.92	2.96
Gopher Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.03	0.03
Grass Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00	--	--	--	--	0.10	0.10
Nearshore Rockfish Unid	--	--	--	--	--	--	--	--	--	--	--	--	--	0.02	0.02	--	--	--	--	--	--
Olive Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00	--	--	--	0.00	0.08	0.08
Quillback Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.01	0.28	0.29	--	--	--	0.18	2.81	2.99
Minor nearshore rockfish (South of 40°10' N. lat.)																					
Black and Yellow Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.06	1.76	1.82	--	--	--	0.24	12.87	13.11
Blue/Deacon Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.02	0.03	0.05	--	--	--	0.92	7.53	8.45
Brown Rockfish	0.18	0.00	0.18	--	0.00	0.00	--	--	--	0.01	0.00	0.02	0.04	0.04	0.08	--	--	--	1.32	17.84	19.16
Calico Rockfish	0.01	--	0.01	0.05	--	0.05	--	--	--	0.10	--	0.10	--	--	--	--	--	--	0.01	--	0.01
China Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	0.24	0.24	--	--	--	0.68	1.25	1.93
Copper Rockfish	0.01	0.00	0.01	0.11	0.01	0.12	--	--	--	0.02	--	0.02	0.06	1.17	1.23	--	--	--	0.15	7.10	7.26
Gopher Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.01	1.39	1.40	--	--	--	1.34	25.42	26.76
Grass Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.01	0.19	0.20	--	--	--	0.03	10.42	10.45
Kelp Rockfish	--	--	--	--	--	--	--	--	--	0.00	--	0.00	--	0.06	0.06	--	--	--	0.03	0.68	0.71
Nearshore Rockfish Unid	--	--	--	--	--	--	0.28	--	0.28	--	--	--	--	0.01	0.01	--	--	--	--	0.20	0.20
Olive Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.02	0.00	0.02	--	--	--	0.08	0.23	0.31
Quillback Rockfish	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	0.49	0.49	--	--	--	--	0.32	0.32
Treefish Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.05	0.00	0.05	--	--	--	0.40	2.31	2.71

Table 13 (continued).

Weight (mt)	Open Access CA halibut			Sea cucumber			Pink shrimp			Ridgeback prawn			Non-nearshore fixed gear			Pacific halibut derby			Nearshore fixed gear		
	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate
Minor shelf rockfish (North of 40°10' N. lat.)																					
Bocaccio Rockfish	--	--	--	--	--	--	0.00	--	0.00	--	--	--	0.07	0.60	0.68	--	0.05	0.05	--	0.00	0.00
Chilipepper Rockfish	--	--	--	--	--	--	1.49	--	1.49	--	--	--	0.12	0.43	0.55	--	0.00	0.00	--	--	--
Cowcod Rockfish	--	--	--	--	--	--	0.01	--	0.01	--	--	--	0.02	--	0.02	--	--	--	--	--	--
Flag Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	0.08	0.08	--	--	--	--	--	--
Greenspotted Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.01	0.00	0.01	--	--	--	--	0.01	0.01
Greenstriped Rockfish	--	--	--	--	--	--	0.68	--	0.68	--	--	--	1.01	0.19	1.20	0.05	0.00	0.06	--	0.00	0.00
Halfbanded Rockfish	--	--	--	--	--	--	0.01	--	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Puget Sound Rockfish	--	--	--	--	--	--	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Pygmy Rockfish	--	--	--	--	--	--	0.17	--	0.17	--	--	--	--	--	--	--	--	--	--	--	--
Redstripe Rockfish	--	--	--	--	--	--	0.17	--	0.17	--	--	--	0.05	--	0.05	--	--	--	--	--	--
Rosethorn Rockfish	--	--	--	--	--	--	0.00	--	0.00	--	--	--	0.38	0.11	0.49	0.01	0.02	0.03	0.01	--	0.01
Rosy Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00	--	--	--	0.03	0.00	0.03
Shelf Rockfish Unid	--	--	--	--	--	--	2.15	--	2.15	--	--	--	0.13	0.44	0.57	--	--	--	--	0.07	0.07
Silvergray Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.65	0.69	1.34	--	0.18	0.18	--	--	--
Squarespot Rockfish	--	--	--	--	--	--	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Stripetail Rockfish	--	--	--	--	--	--	3.44	--	3.44	--	--	--	--	--	--	--	--	--	--	--	--
Tiger Rockfish	--	--	--	--	--	--	0.00	--	0.00	--	--	--	--	0.01	0.01	--	--	--	--	0.25	0.25
Vermilion Rockfish	--	--	--	--	--	--	0.00	--	0.00	--	--	--	--	0.27	0.27	--	0.01	0.01	0.10	3.91	4.02
Minor shelf rockfish (South of 40°10' N. lat.)																					
Bronzespotted Rockfish	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.10	--	0.10
Flag Rockfish	--	--	--	--	--	--	--	--	--	0.01	--	0.01	--	0.14	0.14	--	--	--	0.00	0.04	0.04
Freckled Rockfish	--	--	--	0.00	--	0.00	--	--	--	0.02	--	0.02	--	--	--	--	--	--	0.01	--	0.01
Greenblotched Rockfish	--	--	--	--	--	--	--	--	--	0.08	--	0.08	0.00	0.05	0.05	--	--	--	--	--	--
Greenspotted Rockfish	--	0.00	0.00	0.01	0.00	0.01	--	--	--	0.02	--	0.02	--	1.58	1.58	--	--	--	0.02	0.11	0.13
Greenstriped Rockfish	--	--	--	--	--	--	--	--	--	0.05	--	0.05	0.01	0.13	0.14	--	--	--	0.00	0.00	0.00
Halfbanded Rockfish	0.00	--	0.00	0.64	--	0.64	0.01	--	0.01	4.14	--	4.14	--	--	--	--	--	--	0.03	--	0.03
Honeycomb Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00	--	--	--	0.01	0.00	0.01
Mexican Rockfish	0.00	--	0.00	--	--	--	--	--	--	0.02	--	0.02	--	0.74	0.74	--	--	--	0.00	0.07	0.07
Pink Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	0.21	0.21	--	--	--	--	0.03	0.03
Redstripe Rockfish	--	--	--	--	--	--	0.01	--	0.01	0.01	--	0.01	--	--	--	--	--	--	--	--	--
Rosethorn Rockfish	--	--	--	0.00	--	0.00	--	--	--	--	--	--	--	0.09	0.09	--	--	--	0.00	0.05	0.06
Rosy Rockfish	0.00	--	0.00	--	--	--	--	--	--	0.00	--	0.00	0.01	0.07	0.08	--	--	--	0.02	0.09	0.11
Shelf Rockfish Unid	--	--	--	--	--	--	0.58	--	0.58	0.63	0.04	0.67	--	0.77	0.77	--	--	--	--	0.35	0.35
Speckled Rockfish	--	--	--	--	--	--	--	--	--	0.00	--	0.00	--	0.30	0.30	--	--	--	--	0.13	0.13
Spotted Rockfish Unid	--	--	--	--	--	--	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Squarespot Rockfish	--	--	--	0.02	--	0.02	0.02	--	0.02	0.05	--	0.05	--	0.08	0.08	--	--	--	0.01	0.02	0.03
Starry Rockfish	--	--	--	0.00	--	0.00	--	--	--	--	--	--	--	0.71	0.71	--	--	--	0.02	0.30	0.32
Stripetail Rockfish	0.00	--	0.00	0.06	--	0.06	4.36	--	4.36	4.96	--	4.96	--	--	--	--	--	--	--	--	--
Swordspine Rockfish	--	--	--	--	--	--	--	--	--	0.00	--	0.00	--	--	--	--	--	--	0.00	--	0.00
Vermilion Rockfish	0.01	0.00	0.02	0.03	0.00	0.04	--	--	--	0.56	0.01	0.57	--	33.55	33.55	--	--	--	0.01	10.98	10.99
Yellowtail Rockfish	0.01	--	0.01	--	--	--	--	--	--	--	--	--	0.01	2.68	2.69	--	--	--	0.21	0.64	0.85
Minor slope rockfish (North of 40°10' N. lat.)																					
Aurora Rockfish	--	--	--	--	--	--	0.01	--	0.01	--	--	--	0.03	0.09	0.12	--	0.00	0.00	--	--	--
Bank Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.01	0.00	0.01	--	--	--	--	--	--
Blackgill Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.59	3.21	3.80	--	0.00	0.00	--	--	--
Redbanded Rockfish	--	--	--	--	--	--	0.14	--	0.14	--	--	--	8.52	18.04	26.57	0.06	0.30	0.36	--	--	--
Rougheye/Blackspotted Rockfish	--	--	--	--	--	--	0.01	--	0.01	--	--	--	30.43	30.53	60.96	3.47	1.20	4.67	--	--	--
Sharpchin Rockfish	--	--	--	--	--	--	0.26	--	0.26	--	--	--	0.01	0.00	0.01	--	--	--	--	--	--
Shortraker Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	1.74	2.23	3.97	0.12	0.05	0.18	--	--	--
Shortraker/Rougheye/Blackspotted Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.90	--	0.90	1.73	--	1.73	--	--	--
Slope Rockfish Unid	--	--	--	--	--	--	--	--	--	--	--	--	0.02	1.72	1.74	0.03	0.07	0.10	--	0.00	0.00
Splitnose Rockfish	--	--	--	--	--	--	0.87	--	0.87	--	--	--	0.04	0.05	0.09	--	0.00	0.00	--	--	--
Yellowmouth Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	1.83	1.83	0.02	0.02	0.04	--	--	--
Minor slope rockfish (South of 40°10' N. lat.)																					
Aurora Rockfish	--	--	--	--	--	--	0.38	--	0.38	0.06	--	0.06	0.03	0.71	0.74	--	--	--	--	0.01	0.01
Bank Rockfish	--	--	--	--	--	--	--	--	--	0.00	--	0.00	--	0.32	0.32	--	--	--	--	0.02	0.02
Blackgill Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.46	26.06	26.53	--	--	--	--	0.93	0.93
Redbanded Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.15	0.13	0.27	--	--	--	--	--	--
Rougheye/Blackspotted Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.06	0.01	0.07	--	--	--	--	--	--
Shortraker Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01	0.01	--	--	--	--	--	--
Shortraker/Rougheye/Blackspotted Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.28	--	0.28	--	--	--	--	--	--
Slope Rockfish Unid	--	--	--	--	--	--	--	--	--	0.01	0.04	0.05	0.01	3.20	3.21	--	--	--	--	0.06	0.06
Mixed thornyheads																					
Shortspine/Longspine Thornyhead	--	--	--	--	--	--	--	--	--	--	0.01	0.01	0.52	1.17	1.70	--	--	--	--	0.01	0.01

Table 13 (continued).

Weight (mt)	Open Access CA halibut			Sea cucumber			Pink shrimp			Ridgeback prawn			Non-nearshore fixed gear			Pacific halibut derby			Nearshore fixed gear		
	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate
Other flatfish																					
Curfin Sole	1.56	0.51	2.07	0.01	--	0.01	--	--	--	0.06	0.00	0.07	--	0.03	0.03	--	--	--	--	0.00	0.00
Flatfish Unid	0.02	0.13	0.15	0.00	0.01	0.01	2.11	--	2.11	1.88	1.04	2.92	--	0.04	0.04	--	--	--	--	0.02	0.02
Flathead Sole	--	--	--	--	--	--	0.63	--	0.63	--	--	--	--	--	--	--	--	--	--	--	--
Pacific Sanddab	1.16	0.04	1.20	0.20	0.00	0.20	2.67	--	2.67	33.66	0.09	33.75	0.01	2.79	2.79	--	--	--	0.01	0.01	0.02
Rex Sole	0.03	--	0.03	--	--	--	31.08	--	31.08	0.57	--	0.57	--	--	--	--	--	--	--	--	--
Rock Sole	0.03	0.19	0.22	--	--	--	0.00	--	0.00	--	0.11	0.11	--	0.04	0.04	--	--	--	0.00	0.03	0.03
Sand Sole	0.68	4.75	5.43	--	--	--	--	--	--	--	--	--	--	0.02	0.02	--	--	--	0.00	0.14	0.14
Sanddab Unid	--	0.00	0.00	--	0.00	0.00	--	--	--	--	0.63	0.63	--	3.63	3.63	--	--	--	--	0.14	0.14
Other groundfish																					
Kelp Greenling (California)	0.00	--	0.00	--	--	--	--	--	--	--	--	--	0.01	0.87	0.88	--	--	--	0.02	3.52	3.53
Kelp Greenling (Oregon)	--	--	--	--	--	--	--	--	--	--	--	--	--	0.02	0.02	--	--	--	0.03	8.21	8.24
Leopard Shark	5.54	--	5.54	--	--	--	--	--	--	--	--	--	--	0.56	0.56	--	--	--	--	0.41	0.41
Other rockfish																					
Rockfish Unid	--	--	--	--	--	--	--	--	--	--	--	--	--	0.16	0.16	--	--	--	--	0.27	0.27
Pacific cod	--	--	--	--	--	--	0.01	--	0.01	--	--	--	0.21	1.71	1.92	--	0.05	0.05	--	--	--
Pacific hake	0.00	--	0.00	--	--	--	375.24	--	375.24	17.05	0.04	17.09	1.47	0.25	1.72	0.29	0.03	0.32	--	--	--
Pacific ocean perch (North of 40°10' N. lat.)	--	--	--	--	--	--	0.23	--	0.23	--	--	--	0.08	0.20	0.28	0.02	0.02	0.04	--	--	--
Petrale sole	0.51	2.64	3.15	0.01	0.00	0.01	0.30	--	0.30	0.83	0.43	1.26	0.35	1.67	2.03	0.17	0.07	0.25	--	0.00	0.00
Roundfish unid	--	--	--	--	--	--	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Sablefish (North of 36° N. lat.)	--	--	--	--	--	--	0.19	--	0.19	--	--	--	74.08	2,053.02	2,127.11	9.87	32.65	42.52	--	1.10	1.10
Sablefish (South of 36° N. lat.)	--	--	--	--	--	--	0.01	--	0.01	0.05	0.00	0.05	3.90	332.80	336.70	--	--	--	--	12.53	12.53
Shortbelly rockfish	--	--	--	0.00	--	0.00	21.50	--	21.50	0.03	--	0.03	--	--	--	--	--	--	--	--	--
Shortspine thornyhead (North of 34°27' N. lat.)	--	--	--	--	--	--	0.04	--	0.04	--	--	--	5.12	55.81	60.93	0.75	0.13	0.87	--	3.38	3.38
Shortspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--	3.76	136.44	140.20	--	--	--	--	0.00	0.00
Spiny dogfish	5.56	--	5.56	0.17	--	0.17	0.01	--	0.01	0.38	--	0.38	65.06	2.96	68.01	0.19	0.03	0.22	0.09	0.06	0.16
Splitnose rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	2.88	--	2.88	0.02	--	0.02	--	0.08	0.08	--	--	--	--	0.02	0.02
Starry flounder	1.03	3.53	4.56	--	--	--	--	--	--	--	--	--	--	0.04	0.04	--	--	--	--	0.04	0.04
Widow rockfish	--	--	--	--	--	--	0.00	--	0.00	--	--	--	0.10	1.45	1.55	0.02	0.01	0.03	0.06	0.74	0.80
YELLOWWEY ROCKFISH	--	--	--	--	--	--	0.00	--	0.00	--	--	--	2.22	0.07	2.29	0.68	--	0.68	2.11	0.01	2.12
Yellowtail rockfish (North of 40°10' N. lat.)	--	--	--	--	--	--	0.00	--	0.00	--	--	--	0.44	0.69	1.13	0.04	0.04	0.08	0.17	1.11	1.28
<b>Non-groundfish species</b>																					
California halibut	20.01	96.43	116.44	--	--	--	--	--	--	0.05	2.04	2.09	--	1.63	1.63	--	--	--	--	0.53	0.53
Dungeness crab	114.54	--	114.54	--	--	--	0.00	--	0.00	--	--	--	0.67	3.91	4.57	0.02	--	0.02	0.12	2.08	2.21
Non-FMP flatfish																					
Deepsea Sole	--	--	--	--	--	--	0.11	--	0.11	--	--	--	0.03	--	0.03	--	--	--	--	--	--
Diamond Turbot	0.04	--	0.04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hornyhead Turbot	1.37	0.00	1.37	0.16	0.00	0.16	--	--	--	1.73	--	1.73	--	--	--	--	--	--	--	--	--
Longfin Sanddab	0.25	--	0.25	0.15	--	0.15	0.00	--	0.00	1.78	--	1.78	--	--	--	--	--	--	--	--	--
Slender Sole	0.00	0.07	0.07	--	--	--	71.45	--	71.45	2.49	--	2.49	--	--	--	--	--	--	--	--	--
Speckled Sanddab	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other nongroundfish																					
Brown Irish Lord Sculpin	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01	--	0.01
Buffalo Sculpin	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.17	--	0.17
California Sheephead	--	--	--	--	--	--	--	--	--	--	--	--	3.41	0.10	3.51	--	--	--	57.05	19.90	76.95
Red Irish Lord Sculpin	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.12	--	0.12
Sculpin Unid	0.05	--	0.05	0.08	--	0.08	0.20	--	0.20	0.08	0.02	0.10	0.00	--	0.00	--	--	--	0.15	--	0.15
Skate Unid	0.00	0.40	0.41	--	--	--	0.00	--	0.00	0.02	1.01	1.03	4.32	0.75	5.07	2.70	0.66	3.36	--	0.11	0.11
Squid Unid	--	--	--	--	--	--	--	--	--	--	--	--	--	0.02	0.02	--	--	--	--	--	--
Starry Skate	0.29	0.00	0.29	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01	--	0.01
Shared ecosystem component species																					
Barracudina Unid	--	--	--	--	--	--	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Lanternfish Unid	--	--	--	--	--	--	0.02	--	0.02	--	--	--	--	--	--	--	--	--	--	--	--
Non-Eulachon Smelt Unid	--	--	--	--	--	--	1.04	--	1.04	0.03	--	0.03	--	--	--	--	--	--	--	--	--
Non-Humboldt Squid Unid	0.03	--	0.03	0.00	--	0.00	6.08	--	6.08	0.36	--	0.36	--	--	--	--	--	--	--	--	--
Pacific Sandlance	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pacific Saury	--	--	--	--	--	--	0.00	--	0.00	--	--	--	--	--	--	--	--	--	0.00	--	0.00
Smelt Unid	--	--	--	--	--	--	--	--	--	--	--	--	--	0.05	0.05	--	--	--	--	--	--

**Table 14. Incidental Landings.**

Incidental landings (mt) of groundfish from unobserved shoreside commercial fisheries by gear group. To maintain confidentiality, discard and landings from non-EM exempted fishing permits are incorporated.

	Shoreside Commercial Landings (mt)							Total Incidental Estimate
	Bottom Trawl	Hook & Line	Other Miscellaneous Gears	Other Net Gears	Pot	Shrimp Trawl	Troll	
<b>Groundfish species</b>								
Arrowtooth flounder	--	0.89	--	--	--	--	--	0.89
Big skate	0.04	0.72	--	--	--	--	--	0.76
Black rockfish (California)	--	0.09	0.00	0.03	--	--	0.02	0.14
Black rockfish (Oregon)	--	14.05	--	--	--	--	0.19	14.23
Bocaccio rockfish (South of 40°10' N. lat.)	1.55	0.34	0.01	0.00	--	--	0.03	1.93
Cabezon (California)	--	0.03	0.04	0.04	0.09	--	0.01	0.20
Cabezon (Oregon)	--	3.21	--	--	--	--	--	3.21
Canary rockfish	0.05	0.57	0.07	0.00	0.01	--	0.30	1.00
Chilipepper rockfish (South of 40°10' N. lat.)	9.86	1.81	--	--	--	--	0.21	11.88
COWCOD ROCKFISH (South of 40°10' N. lat.)	--	0.00	--	--	--	--	--	0.00
Darkblotched rockfish	0.01	0.06	--	--	--	--	--	0.07
Dover sole	7.85	0.07	--	13.74	--	0.01	--	21.66
<b>Ecosystem component species</b>								
Black Skate	--	0.00	--	--	--	--	--	0.00
California Skate	0.01	--	--	0.28	0.01	--	--	0.29
Grenadier Unid	--	--	0.02	--	--	--	0.01	0.03
Pacific Grenadier	0.05	--	--	--	--	--	--	0.05
Soupin Shark	0.09	0.19	--	4.39	--	0.00	--	4.68
Spotted Ratfish	--	--	--	0.00	--	--	--	0.00
English sole	0.14	--	--	0.01	--	0.29	--	0.44
Lingcod (North of 40°10' N. lat.)	--	7.55	--	--	0.22	--	2.99	10.76
Lingcod (South of 40°10' N. lat.)	0.99	1.61	2.15	0.11	0.19	--	1.69	6.74
Longnose skate	0.05	3.21	0.01	--	--	--	--	3.28
Longspine thornyhead (North of 34°27' N. lat.)	4.51	--	0.00	--	--	--	0.01	4.52
Longspine thornyhead (South of 34°27' N. lat.)	--	0.22	--	0.02	--	--	--	0.24
<b>Minor nearshore rockfish (North of 40°10' N. lat.)</b>								
Black and Yellow Rockfish	--	0.00	--	--	--	--	--	0.00
Blue/Deacon Rockfish	--	0.57	--	--	--	--	--	0.57
Brown Rockfish	--	0.00	--	--	--	--	--	0.00
China Rockfish	--	0.61	--	--	--	--	--	0.61
Copper Rockfish	--	0.16	--	--	--	--	--	0.16
Gopher Rockfish	--	0.01	--	--	--	--	--	0.01
Grass Rockfish	--	0.03	--	--	--	--	--	0.03
Olive Rockfish	--	0.00	--	--	--	--	--	0.00
Quillback Rockfish	--	0.26	--	--	--	--	--	0.26
<b>Minor nearshore rockfish (South of 40°10' N. lat.)</b>								
Black and Yellow Rockfish	--	0.00	0.07	--	0.08	--	0.01	0.15
Blue/Deacon Rockfish	--	0.02	0.01	0.01	--	--	0.02	0.06
Brown Rockfish	0.00	0.02	--	0.15	--	0.00	0.01	0.19
Calico Rockfish	--	--	--	--	--	--	0.00	0.00
China Rockfish	--	0.00	0.01	--	--	--	0.00	0.01
Copper Rockfish	0.02	0.00	0.04	--	--	--	0.00	0.05
Gopher Rockfish	--	0.09	0.03	--	0.01	--	0.03	0.16
Grass Rockfish	--	--	0.02	--	0.01	--	--	0.03
Kelp Rockfish	--	--	--	--	0.00	--	--	0.00
Olive Rockfish	--	0.00	0.00	0.00	--	--	0.00	0.01
Treefish Rockfish	--	0.00	0.00	--	--	--	0.01	0.01
<b>Minor shelf rockfish (North of 40°10' N. lat.)</b>								
Bocaccio Rockfish	--	0.05	--	--	--	--	--	0.05
Chilipepper Rockfish	--	0.00	--	--	--	--	--	0.00
Greenspotted Rockfish	--	0.00	--	--	--	--	--	0.00
Greenstriped Rockfish	--	0.00	--	--	--	--	--	0.00
Rosethorn Rockfish	--	0.02	--	--	--	--	--	0.02
Silvergray Rockfish	--	0.18	--	--	--	--	--	0.18
Tiger Rockfish	--	0.02	--	--	--	--	--	0.02
Vermilion Rockfish	--	0.26	--	--	0.00	--	--	0.26
<b>Minor shelf rockfish (South of 40°10' N. lat.)</b>								
Flag Rockfish	0.00	0.01	0.00	--	--	--	--	0.02
Greenblotched Rockfish	0.00	0.00	--	--	--	--	--	0.00
Greenspotted Rockfish	0.01	0.03	0.02	--	--	--	--	0.06
Rosy Rockfish	--	--	--	--	--	--	0.01	0.01
Shelf Rockfish Unid	--	0.25	0.00	--	--	0.00	0.01	0.26
Speckled Rockfish	--	0.01	0.00	--	--	--	--	0.01
Squarespot Rockfish	--	0.02	--	--	--	--	--	0.02
Starry Rockfish	--	0.03	0.00	0.01	--	--	--	0.05
Vermilion Rockfish	0.04	0.72	0.14	0.02	0.01	0.02	0.46	1.41
Yellowtail Rockfish	0.00	1.85	0.00	0.02	--	--	0.14	2.01

**Table 14 (continued).**

	Shoreside Commercial Landings (mt)							Total Incidental Estimate
	Bottom Trawl	Hook & Line	Other Miscellaneous Gears	Other Net Gears	Pot	Shrimp Trawl	Troll	
Minor slope rockfish (North of 40°10' N. lat.)								
Aurora Rockfish	--	0.00	--	--	--	--	--	0.00
Blackgill Rockfish	--	0.00	--	--	--	--	--	0.00
Redbanded Rockfish	--	0.33	--	--	--	--	--	0.33
Rougheye/Blackspotted Rockfish	--	1.38	--	--	--	--	0.06	1.44
Shortraker Rockfish	--	0.06	--	--	--	--	--	0.06
Slope Rockfish Unid	--	0.07	--	--	0.02	--	--	0.09
Splitnose Rockfish	--	0.00	--	--	--	--	--	0.00
Yellowmouth Rockfish	--	0.02	--	--	--	--	--	0.02
Minor slope rockfish (South of 40°10' N. lat.)								
Aurora Rockfish	--	0.01	--	--	--	--	--	0.01
Blackgill Rockfish	0.93	0.06	0.01	--	--	--	--	1.00
Redbanded Rockfish	0.09	0.00	--	--	--	--	--	0.09
Slope Rockfish Unid	--	0.01	0.00	--	--	0.00	0.02	0.03
Mixed thornyheads								
Shortspine/Longspine Thornyhead	--	0.07	0.03	--	--	--	--	0.10
Other flatfish								
Curffin Sole	0.05	--	--	--	--	0.01	--	0.05
Flatfish Unid	0.09	0.02	--	0.26	0.01	0.03	0.01	0.42
Flathead Sole	0.01	--	--	--	--	--	--	0.01
Pacific Sanddab	0.09	0.02	--	0.00	0.00	--	--	0.12
Rex Sole	0.63	--	--	--	--	--	--	0.63
Rock Sole	0.04	0.00	--	0.01	0.00	0.21	0.00	0.26
Sand Sole	0.66	--	--	0.12	--	0.03	0.00	0.81
Sanddab Unid	0.14	0.08	--	0.07	--	0.08	0.11	0.48
Other groundfish								
Kelp Greenling (California)	--	0.00	0.00	0.00	0.02	--	0.00	0.02
Kelp Greenling (Oregon)	--	2.23	--	--	--	--	--	2.23
Leopard Shark	0.01	0.02	--	3.37	0.02	0.01	--	3.43
Other rockfish								
Rockfish Unid	--	0.01	--	--	--	--	0.01	0.02
Pacific cod	--	0.08	--	--	--	--	--	0.08
Pacific hake	0.00	0.03	0.00	--	--	--	--	0.03
Pacific ocean perch (North of 40°10' N. lat.)	--	0.02	--	--	--	--	--	0.02
Petrale sole	5.25	0.08	--	0.03	0.01	0.49	0.01	5.87
Sablefish (North of 36° N. lat.)	5.38	33.86	0.70	0.02	0.56	0.69	--	41.21
Sablefish (South of 36° N. lat.)	--	2.44	0.72	0.22	--	--	0.06	3.44
Shortspine thornyhead (North of 34°27' N. lat.)	0.87	0.18	0.06	--	--	--	--	1.10
Shortspine thornyhead (South of 34°27' N. lat.)	--	1.49	0.01	--	--	--	--	1.50
Spiny dogfish	0.05	0.03	--	0.11	0.04	0.04	--	0.27
Starry flounder	1.53	0.05	--	0.02	--	--	--	1.60
Widow rockfish	0.01	0.37	--	--	--	--	0.06	0.44
YELLOWWEYE ROCKFISH	--	0.02	--	--	--	--	--	0.02
Yellowtail rockfish (North of 40°10' N. lat.)	--	0.14	--	--	--	--	1.66	1.80
California scorpionfish (South of 34°27' N. lat.)	--	--	--	0.03	--	0.07	--	0.09
<b>Non-groundfish species</b>								
California halibut	15.91	67.50	0.04	53.87	0.15	15.43	1.25	154.14
Dungeness crab	0.08	3.08	41.23	1.60	21,818.39	--	1.29	21,865.66
Non-FMP flatfish								
Hornyhead Turbot	0.00	--	--	0.00	--	--	--	0.01
Other nongroundfish								
California Sheephead	--	0.01	0.02	0.15	1.68	0.05	0.02	1.93
Sculpin Unid	0.19	--	0.00	--	--	0.01	--	0.20
Skate Unid	0.04	0.66	--	2.70	--	1.21	--	4.62
Squid Unid	--	--	--	10.83	--	--	--	10.83
Shared ecosystem component species								
Round Herring	--	--	--	0.81	--	--	--	0.81
Smelt Unid	--	2.56	--	131.87	0.70	--	0.04	135.17

**Table 15. Fishing Mortality Estimates by Sector.**

Estimated fishing mortality (mt) of groundfish and a subset of non-groundfish species by sector.

	Commercial fisheries														WA tribal shoreside	Recreational fishing mortality			Research	Estimated fishing mortality
	IFQ/Co-op Management						Non-IFQ													
	Bottom trawl	Fixed gear	Midwater rockfish	Shoreside midwater hake	At-sea midwater CP	At-sea midwater MSCV	OA CA halibut	Sea cucumber	Pink shrimp	Ridgeback prawn	Non- nearshore fixed gear	Pacific halibut derby	Nearshore fixed gear	Incidental fisheries		WA	OR	CA		
Groundfish species																				
Arrowtooth flounder	1,355.34	4.09	0.78	6.85	13.86	3.65	--	--	1.13	0.01	35.10	16.24	--	0.89	0.44	--	0.13	0.00	7.32	1,445.84
Big skate	220.48	0.13	1.26	1.34	2.14	0.64	19.98	0.06	0.00	0.00	6.14	0.91	0.09	0.76	0.14	--	0.39	0.00	5.46	259.93
Black rockfish (California)	--	--	--	--	--	--	--	--	--	0.00	11.52	--	42.05	0.14	--	--	--	97.29	0.08	151.09
Black rockfish (Oregon)	0.00	--	0.00	--	--	--	--	--	--	--	3.15	--	108.23	14.23	--	--	418.22	--	0.08	543.92
Black rockfish (Washington)	0.23	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	247.56	--	--	0.09	247.89
Bocaccio rockfish (South of 40°10' N. lat.)	87.55	0.06	--	--	--	--	--	0.00	0.12	0.15	5.52	--	0.77	1.93	--	--	--	125.75	3.21	225.07
Cabazon (California)	--	--	--	--	--	--	0.01	--	--	0.02	2.82	--	21.02	0.20	--	--	--	31.34	0.01	55.40
Cabazon (Oregon)	--	--	--	--	--	--	--	--	--	--	0.15	--	25.23	3.21	--	--	22.31	--	0.00	50.91
California scorpionfish (North of 34°27' N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--	0.01	--	--	--	--	--	--	0.01
California scorpionfish (South of 34°27' N. lat.)	--	--	--	--	--	--	0.40	0.16	--	0.92	1.13	--	0.11	0.09	--	--	--	82.99	0.15	85.94
Canary rockfish	133.19	0.01	34.40	74.27	2.06	4.50	0.01	--	0.07	0.01	5.03	0.24	6.85	1.00	13.63	5.03	28.35	82.05	10.09	400.80
Chilipepper rockfish (South of 40°10' N. lat.)	105.49	--	--	--	--	--	0.01	0.01	1.07	0.65	1.02	--	0.01	11.88	--	--	--	2.62	5.05	127.80
COWCOD ROCKFISH (South of 40°10' N. lat.)	0.42	--	--	--	--	--	--	--	0.09	0.07	--	--	--	0.00	--	--	--	0.80	0.35	1.73
Darkblotched rockfish	150.49	0.08	0.19	33.02	32.00	7.64	--	0.00	6.05	0.01	5.54	0.69	--	0.07	0.32	--	0.00	--	1.67	237.77
Dover sole	7,338.57	1.62	0.05	0.01	0.36	0.11	0.00	0.05	4.56	10.52	6.09	0.22	--	21.66	124.00	--	0.19	0.00	38.73	7,546.74
Ecosystem component species																				
Aleutian Skate	0.63	--	--	--	0.00	0.00	--	--	0.00	--	0.08	--	--	--	--	--	--	--	0.00	0.71
Black Skate	10.72	0.17	--	--	--	--	--	--	--	--	5.40	--	--	0.00	--	--	--	--	0.62	16.91
California Grenadier	0.08	--	--	--	--	--	--	--	--	--	0.18	--	--	--	--	--	--	--	0.06	0.32
California Skate	1.22	--	--	--	0.00	0.02	20.08	1.58	0.03	1.09	0.12	--	0.00	0.29	--	--	--	0.00	0.32	24.76
Deepsea Skate	0.07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.04	0.12
Giant Grenadier	44.57	1.03	--	--	--	--	--	--	--	--	8.43	--	--	--	--	--	--	--	1.91	55.95
Grenadier Unid	13.39	0.03	--	--	1.01	0.09	--	--	--	--	22.00	--	--	0.03	--	--	--	--	0.04	36.59
Pacific Flatnose	0.27	0.04	--	--	0.00	--	--	--	0.00	--	0.40	--	--	--	--	--	--	--	0.17	0.87
Pacific Grenadier	17.52	1.17	--	--	--	--	--	--	--	--	9.73	--	--	0.05	--	--	--	--	4.61	33.07
Popeye Grenadier	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Sandpaper Skate	49.12	0.24	0.13	--	0.00	--	0.00	--	0.05	--	2.94	0.13	--	--	--	--	--	--	0.90	53.52
Shark and Skate Unid	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.40	0.40
Shoulderspot Grenadier	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Smooth Grenadier	0.00	--	--	--	--	--	--	--	--	--	0.01	--	--	--	--	--	--	--	0.03	0.04
Soupin Shark	0.91	--	0.02	0.54	0.97	0.91	0.93	--	0.00	0.04	0.77	--	0.67	4.68	0.02	--	--	0.00	1.00	11.47
Spotted Ratfish	79.66	0.08	0.89	--	0.00	--	0.01	--	0.16	0.73	3.91	0.20	0.01	0.00	--	--	--	0.00	3.62	89.28
English sole	246.29	0.00	0.23	0.01	0.04	0.01	2.49	1.38	0.04	22.80	0.00	--	0.00	0.44	71.11	--	--	--	4.05	348.89
Groundfish unid	--	--	--	0.19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.19

Table 15 (continued).

	Commercial fisheries														WA tribal shoreside	Recreational fishing mortality				Research	Estimated fishing mortality
	IFQ/Co-op Management						Non-IFQ														
	Bottom trawl	Fixed gear	Midwater rockfish	Shoreside midwater hake	At-sea midwater CP	At-sea midwater MSCV	OA CA halibut	Sea cucumber	Pink shrimp	Ridgeback prawn	Non- nearshore fixed gear	Pacific halibut derby	Nearshore fixed gear	Incidental fisheries		WA	OR	CA			
Lingcod (North of 40°10' N. lat.)	593.14	3.05	2.43	7.91	0.13	0.85	--	--	0.01	--	55.06	1.46	56.94	10.76	23.34	167.57	178.23	63.18	3.28	1,167.34	
Lingcod (South of 40°10' N. lat.)	22.24	0.34	--	--	--	--	1.09	0.04	--	0.40	36.33	--	23.50	6.74	--	--	--	446.46	1.67	538.81	
Longnose skate	756.64	5.62	1.51	0.42	0.45	0.52	0.22	0.02	0.49	0.39	106.45	7.06	0.02	3.28	7.00	--	0.21	0.00	9.44	899.72	
Longspine thornyhead (North of 34°27' N. lat.)	803.43	0.03	0.05	0.00	0.00	--	--	--	0.00	--	7.43	--	0.47	4.52	0.11	--	--	--	17.26	833.28	
Longspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	--	--	--	--	12.04	--	--	0.24	--	--	--	--	1.25	13.53	
Minor nearshore rockfish (North of 40°10' N. lat.)																					
Black and Yellow Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.01	0.00	--	--	0.01	0.01	--	0.03	
Blue/Deacon Rockfish	0.00	--	--	0.00	--	--	--	--	0.00	--	0.81	--	11.16	0.57	--	1.51	24.42	5.70	0.30	44.48	
Brown Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.04	0.00	--	--	0.11	0.45	--	0.60	
China Rockfish	--	--	--	--	--	--	--	--	--	--	0.03	--	4.19	0.61	--	1.34	2.24	0.87	0.01	9.28	
Copper Rockfish	0.00	--	--	--	--	--	--	--	--	--	0.24	--	2.96	0.16	0.01	1.03	7.48	6.33	0.06	18.27	
Gopher Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.03	0.01	--	--	0.00	0.05	--	0.09	
Grass Rockfish	--	--	--	--	--	--	--	--	--	--	0.00	--	0.10	0.03	--	--	0.04	0.11	--	0.29	
Nearshore Rockfish Unid	0.00	--	--	0.00	--	--	--	--	--	--	0.02	--	--	--	0.00	--	--	--	0.00	0.02	
Olive Rockfish	--	--	--	--	--	--	--	--	--	--	0.00	--	0.08	0.00	--	--	0.16	0.56	0.00	0.81	
Quillback Rockfish	0.06	--	--	--	--	--	--	--	--	--	0.29	--	2.99	0.26	0.05	1.59	6.82	4.22	0.09	16.36	
Minor nearshore rockfish (South of 40°10' N. lat.)																					
Black and Yellow Rockfish	--	--	--	--	--	--	--	--	--	--	1.82	--	13.11	0.15	--	--	--	10.61	--	25.70	
Blue/Deacon Rockfish	--	--	--	--	--	--	--	--	--	--	0.05	--	8.45	0.06	--	--	--	184.37	0.08	193.01	
Brown Rockfish	0.00	--	--	--	--	--	0.18	0.00	--	0.02	0.08	--	19.16	0.19	--	--	--	69.54	0.02	89.19	
Calico Rockfish	--	--	--	--	--	--	0.01	0.05	--	0.10	--	--	0.01	0.00	--	--	--	0.64	0.00	0.81	
China Rockfish	--	--	--	--	--	--	--	--	--	--	0.24	--	1.93	0.01	--	--	--	11.28	0.01	13.47	
Copper Rockfish	--	0.00	--	--	--	--	0.01	0.12	--	0.02	1.23	--	7.26	0.05	--	--	--	209.58	0.52	218.80	
Gopher Rockfish	--	--	--	--	--	--	--	--	--	--	1.40	--	26.76	0.16	--	--	--	50.06	0.02	78.40	
Grass Rockfish	--	--	--	--	--	--	--	--	--	--	0.20	--	10.45	0.03	--	--	--	10.80	--	21.49	
Kelp Rockfish	--	--	--	--	--	--	--	--	--	0.00	0.06	--	0.71	0.00	--	--	--	12.65	--	13.44	
Nearshore Rockfish Unid	--	--	--	--	--	--	--	--	0.28	--	0.01	--	0.20	--	--	--	--	--	0.00	0.49	
Olive Rockfish	--	--	--	--	--	--	--	--	--	--	0.02	--	0.31	0.01	--	--	--	35.32	0.09	35.74	
Quillback Rockfish	--	--	--	--	--	--	0.00	--	--	--	0.49	--	0.32	--	--	--	--	5.44	0.01	6.26	
Treefish Rockfish	--	--	--	--	--	--	--	--	--	--	0.05	--	2.71	0.01	--	--	--	13.38	--	16.16	

Table 15 (continued).

	Commercial fisheries															WA tribal shoreside	Recreational fishing mortality			Research	Estimated fishing mortality
	IFQ/Co-op Management						Non-IFQ														
	Bottom trawl	Fixed gear	Midwater rockfish	Shoreside midwater hake	At-sea midwater CP	At-sea midwater MSCV	OA CA halibut	Sea cucumber	Pink shrimp	Ridgeback prawn	Non- nearshore fixed gear	Pacific halibut derby	Nearshore fixed gear	Incidental fisheries	WA		OR	CA			
Minor shelf rockfish (North of 40°10' N. lat.)	20.69	0.00	2.82	4.77	0.38	0.35	--	--	0.00	--	0.68	0.05	0.00	0.05	7.20	1.22	0.08	0.10	0.28	38.65	
Bocaccio Rockfish	24.91	--	4.24	51.22	1.29	11.32	--	--	1.49	--	0.55	0.00	--	0.00	--	--	--	--	0.61	95.64	
Chillipepper Rockfish	0.00	--	--	--	--	--	--	--	0.01	--	0.02	--	--	--	--	--	--	0.00	--	0.03	
Cowcod Rockfish	--	--	--	--	--	--	--	--	--	--	0.08	--	--	--	--	--	--	--	--	0.08	
Flag Rockfish	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	
Greenblotched Rockfish	0.12	--	0.00	--	--	--	--	--	--	--	0.01	--	0.01	0.00	--	--	0.01	--	0.10	0.25	
Greenspotted Rockfish	45.48	0.01	0.12	0.10	--	--	--	--	0.68	--	1.20	0.06	0.00	0.00	0.50	--	0.01	--	2.12	50.28	
Greenstriped Rockfish	0.00	--	--	--	--	--	--	--	0.01	--	--	--	--	--	--	--	--	--	0.00	0.01	
Halfbanded Rockfish	0.00	--	0.02	0.08	0.01	0.01	--	--	--	--	--	--	--	--	0.00	--	--	--	--	0.11	
Harlequin Rockfish	--	--	--	--	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	0.00	0.00	
Puget Sound Rockfish	0.02	--	--	--	--	--	--	--	0.17	--	--	--	--	--	--	--	--	--	0.13	0.32	
Pygmy Rockfish	3.94	--	10.02	15.99	0.77	0.20	--	--	0.17	--	0.05	--	--	--	0.48	--	0.04	--	2.56	34.22	
Redstripe Rockfish	3.30	0.05	0.00	--	0.00	--	--	--	0.00	--	0.49	0.03	0.01	0.02	0.36	--	0.06	--	0.58	4.89	
Rosethorn Rockfish	0.02	--	--	--	--	--	--	--	--	--	0.00	--	0.03	--	--	--	0.00	0.02	0.00	0.08	
Rosy Rockfish	24.54	0.00	0.04	0.02	--	--	--	--	2.15	--	0.57	--	0.07	--	0.12	--	--	--	--	27.51	
Shelf Rockfish Unid	1.19	0.01	0.59	4.17	0.77	0.41	--	--	--	--	1.34	0.18	--	0.18	5.56	--	0.04	--	1.12	15.54	
Silvergray Rockfish	--	--	--	--	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	--	0.00	
Squarespot Rockfish	0.03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.03	
Starry Rockfish	22.43	--	0.02	--	0.00	0.00	--	--	3.44	--	--	--	--	--	--	--	--	--	3.49	29.38	
Stripetail Rockfish	0.00	--	--	--	--	--	--	--	0.00	--	0.01	--	0.25	0.02	--	0.15	0.79	0.34	0.01	1.57	
Tiger Rockfish	--	--	--	--	--	--	--	--	0.00	--	0.27	0.01	4.02	0.26	--	1.05	8.83	6.49	0.03	20.95	
Vermilion Rockfish																					
Minor shelf rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	0.00	--	--	--	--	--	0.10	--	--	--	--	--	0.01	0.11	
Bronzespotted Rockfish	--	0.00	--	--	--	--	--	--	--	0.01	0.14	--	0.04	0.02	--	--	--	10.86	0.02	11.09	
Flag Rockfish	--	--	--	--	--	--	--	0.00	--	0.02	--	--	0.01	--	--	--	--	--	0.00	0.03	
Freckled Rockfish	0.02	--	--	--	--	--	--	--	--	0.08	0.05	--	--	0.00	--	--	--	0.41	0.01	0.57	
Greenblotched Rockfish	0.31	--	--	--	--	--	0.00	0.01	--	0.02	1.58	--	0.13	0.06	--	--	--	16.89	0.50	19.50	
Greenspotted Rockfish	0.69	--	--	--	--	--	--	--	--	0.05	0.14	--	0.00	--	--	--	--	0.86	0.20	1.94	
Greenstriped Rockfish	0.00	--	--	--	--	--	0.00	0.64	0.01	4.14	--	--	0.03	--	--	--	--	1.33	1.01	7.16	
Halfbanded Rockfish	--	--	--	--	--	--	--	--	--	--	0.00	--	0.01	--	--	--	--	6.03	0.00	6.05	
Honeycomb Rockfish	0.03	--	--	--	--	--	0.00	--	--	0.02	0.74	--	0.07	--	--	--	--	0.00	0.01	0.88	
Mexican Rockfish	0.02	--	--	--	--	--	--	--	--	--	0.21	--	0.03	--	--	--	--	--	0.02	0.28	
Pink Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00	
Pinkrose Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.01	
Redstripe Rockfish	0.01	--	--	--	--	--	--	0.00	--	0.01	--	--	--	--	--	--	--	--	0.01	0.17	
Rosethorn Rockfish	0.00	--	--	--	--	--	0.00	--	--	0.00	0.08	--	0.11	0.01	--	--	--	12.64	0.20	13.03	
Rosy Rockfish	0.06	--	--	--	--	--	--	--	0.58	0.67	0.77	--	0.35	0.26	--	--	--	--	--	2.70	
Shelf Rockfish Unid	0.04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.04	
Silvergray Rockfish	--	--	--	--	--	--	--	--	--	0.00	0.30	--	0.13	0.01	--	--	--	8.91	0.27	9.62	
Speckled Rockfish	--	--	--	--	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	--	0.00	
Spotted Rockfish Unid	--	--	--	--	--	--	--	0.02	0.02	0.05	0.08	--	0.03	0.02	--	--	--	17.87	0.29	18.39	
Squarespot Rockfish	--	--	--	--	--	--	--	0.00	--	--	0.71	--	0.32	0.05	--	--	--	48.36	0.12	49.55	
Starry Rockfish	0.67	--	--	--	--	--	0.00	0.06	4.36	4.96	--	--	--	--	--	--	--	0.00	0.77	10.83	
Stripetail Rockfish	--	--	--	--	--	--	--	--	--	0.00	--	--	0.00	--	--	--	--	0.01	0.03	0.04	
Swordspine Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.26	--	0.26	
Tiger Rockfish	0.06	0.22	--	--	--	--	0.02	0.04	--	0.57	33.55	--	10.99	1.41	--	--	--	288.34	5.52	340.72	
Vermilion Rockfish	0.04	--	--	--	--	--	0.01	--	--	--	2.69	--	0.85	2.01	--	--	--	72.48	0.38	78.45	
Yellowtail Rockfish																					



Table 15 (continued).

	Commercial fisheries															WA tribal shoreside	Recreational fishing mortality			Research	Estimated fishing mortality
	IFQ/Co-op Management						Non-IFQ														
	Bottom trawl	Fixed gear	Midwater rockfish	Shoreside midwater hake	At-sea midwater CP	At-sea midwater MSCV	OA CA halibut	Sea cucumber	Pink shrimp	Ridgeback prawn	Non- nearshore fixed gear	Pacific halibut derby	Nearshore fixed gear	Incidental fisheries	WA		OR	CA			
Minor slope rockfish (North of 40°10' N. lat.)																					
Aurora Rockfish	25.32	0.03	0.02	0.38	0.01	--	--	--	0.01	--	0.12	0.00	--	0.00	0.02	--	--	--	0.21	26.12	
Bank Rockfish	2.45	0.00	0.02	--	0.05	0.01	--	--	--	--	0.01	--	--	--	--	--	--	--	--	2.55	
Blackgill Rockfish	4.93	0.03	0.02	--	0.00	0.01	--	--	--	--	3.80	0.00	--	0.00	0.09	--	--	--	--	8.88	
Redbanded Rockfish	6.42	1.17	0.00	--	0.03	0.03	--	--	0.14	--	26.57	0.36	--	0.33	12.46	--	--	--	0.04	47.54	
Rougheye/Blackspotted Rockfish	24.63	7.94	0.43	2.49	33.87	4.27	--	--	0.01	--	60.96	4.67	--	1.44	16.62	--	--	--	0.25	157.58	
Sharpchin Rockfish	4.15	0.00	0.13	3.15	0.03	0.00	--	--	0.26	--	0.01	--	--	--	--	--	--	--	--	7.74	
Shortraker Rockfish	8.14	0.87	0.02	0.07	0.03	0.00	--	--	--	--	3.97	0.18	--	0.06	1.09	--	--	--	0.04	14.46	
Shortraker/Rougheye/Blackspotted Rockfish	--	0.05	--	--	--	--	--	--	--	--	0.90	1.73	--	--	--	--	--	--	--	2.68	
Slope Rockfish Unid	1.60	0.10	0.19	5.47	--	--	--	--	--	--	1.74	0.10	0.00	0.09	0.01	--	--	--	--	9.30	
Splitnose Rockfish	22.14	0.00	1.12	37.02	62.55	22.67	--	--	0.87	--	0.09	0.00	--	0.00	0.04	--	--	--	0.00	146.50	
Yellowmouth Rockfish	4.53	0.00	0.02	0.04	0.38	0.00	--	--	--	--	1.83	0.04	--	0.02	0.00	--	--	--	--	6.86	
Minor slope rockfish (South of 40°10' N. lat.)																					
Aurora Rockfish	6.12	0.01	--	--	--	--	--	--	0.38	0.06	0.74	--	0.01	0.01	--	--	--	--	0.53	7.85	
Bank Rockfish	33.49	--	--	--	--	--	--	--	--	0.00	0.32	--	0.02	--	--	--	--	0.62	0.48	34.94	
Blackgill Rockfish	19.59	0.64	--	--	--	--	--	--	--	--	26.53	--	0.93	1.00	--	--	--	--	0.44	49.12	
Pacific Ocean Perch	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01	0.01	
Redbanded Rockfish	0.37	--	--	--	--	--	--	--	--	--	0.27	--	--	0.09	--	--	--	--	0.12	0.85	
Rougheye/Blackspotted Rockfish	0.02	--	--	--	--	--	--	--	--	--	0.07	--	--	--	--	--	--	--	0.12	0.21	
Sharpchin Rockfish	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	16.42	16.43	
Shortraker Rockfish	0.01	--	--	--	--	--	--	--	--	--	0.01	--	--	--	--	--	--	--	0.05	0.06	
Shortraker/Rougheye/Blackspotted Rockfish	--	--	--	--	--	--	--	--	--	--	0.28	--	--	--	--	--	--	--	--	0.28	
Slope Rockfish Unid	0.12	--	--	--	--	--	--	--	--	0.05	3.21	--	0.06	0.03	--	--	--	--	--	3.46	
Yellowmouth Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.04	0.04	
Mixed thornyheads																					
Shortspine/Longspine Thornyhead	0.23	0.02	--	--	--	--	--	--	--	0.01	1.70	--	0.01	0.10	--	--	--	--	--	2.07	
Other flatfish																					
Butter Sole	0.03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.04	--	0.01	0.08	
Curlfin Sole	0.64	--	0.00	--	--	--	2.07	0.01	--	0.07	0.03	--	0.00	0.05	--	--	--	0.00	0.13	3.00	
Flatfish Unid	3.13	0.01	0.00	0.01	0.00	0.00	0.15	0.01	2.11	2.92	0.04	--	0.02	0.42	29.85	--	--	0.00	--	38.67	
Flathead Sole	40.75	--	0.27	0.00	0.00	0.01	--	--	0.63	--	--	--	--	0.01	--	--	--	--	0.62	42.29	
Pacific Sanddab	121.97	--	0.02	0.00	--	0.00	1.20	0.20	2.67	33.75	2.79	--	0.02	0.12	--	--	2.44	32.34	8.78	206.31	
Rex Sole	549.76	0.00	0.80	0.05	7.34	1.12	0.03	--	31.08	0.57	--	--	--	0.63	77.64	--	--	--	10.51	679.52	
Rock Sole	1.47	--	0.00	0.00	--	--	0.22	--	0.00	0.11	0.04	--	0.03	0.26	7.26	--	0.03	1.31	0.17	10.92	
Sand Sole	5.80	--	--	--	--	--	5.43	--	--	--	0.02	--	0.14	0.81	0.11	--	0.41	0.11	--	12.82	
Sanddab Unid	4.31	--	--	--	--	--	0.00	0.00	--	0.63	3.63	--	0.14	0.48	0.07	--	--	0.00	0.01	9.28	
Other groundfish																					
Cabezon (Washington)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.05	--	--	0.01	6.06	
Greenling Unid	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.64	0.05	--	0.69	
Kelp Greenling (California)	--	--	--	--	--	--	0.00	--	--	--	0.88	--	3.53	0.02	--	--	--	11.97	0.00	16.42	
Kelp Greenling (Oregon)	0.02	--	--	--	--	--	--	--	--	--	0.02	--	8.24	2.23	--	--	16.38	--	0.06	26.96	
Kelp Greenling (Washington)	0.10	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--	1.51	--	--	0.35	1.97	
Leopard Shark	--	--	--	--	--	--	5.54	--	--	--	0.56	--	0.41	3.43	--	--	--	46.84	0.14	56.92	

Table 15 (continued).

	Commercial fisheries														WA tribal shoreside	Recreational fishing mortality			Research	Estimated fishing mortality
	IFQ/Co-op Management						Non-IFQ													
	Bottom trawl	Fixed gear	Midwater rockfish	Shoreside midwater hake	At-sea midwater CP	At-sea midwater MSCV	OA CA halibut	Sea cucumber	Pink shrimp	Ridgeback prawn	Non- nearshore fixed gear	Pacific halibut derby	Nearshore fixed gear	Incidental fisheries						
Other rockfish																				
Rockfish Unid	0.19	0.00	0.68	0.01	--	--	--	--	--	--	0.16	--	0.27	0.02	--	--	0.09	0.00	--	1.43
Pacific cod	41.68	0.00	0.65	0.71	0.01	0.18	--	--	0.01	--	1.92	0.05	--	0.08	112.53	0.77	0.08	--	0.30	158.97
Pacific hake	348.73	0.01	304.09	145,915.53	137,129.71	66,257.03	0.00	--	375.24	17.09	1.72	0.32	--	0.03	6,405.50	--	0.03	0.00	83.80	356,838.82
Pacific ocean perch (North of 40°10' N. lat.)	46.68	0.01	0.21	47.44	20.33	5.93	--	--	0.23	--	0.28	0.04	--	0.02	1.32	--	--	--	1.12	123.63
Petrale sole	2,731.71	0.12	0.19	0.04	0.00	--	3.15	0.01	0.30	1.26	2.03	0.25	0.00	5.87	183.31	--	3.48	2.09	9.96	2,943.76
Roundfish unid	--	--	--	0.02	0.59	--	--	--	0.00	--	--	--	--	--	--	--	0.00	--	--	0.61
Sablefish (North of 36° N. lat.)	1,538.72	850.20	0.42	98.51	67.48	85.79	--	--	0.19	--	2,127.11	42.52	1.10	41.21	466.36	--	3.72	0.00	22.46	5,345.78
Sablefish (South of 36° N. lat.)	1.00	110.37	--	--	--	--	--	--	0.01	0.05	336.70	--	12.53	3.44	--	--	--	--	1.26	465.36
Shortbelly rockfish	0.58	--	3.64	125.31	140.81	27.73	--	0.00	21.50	0.03	--	--	--	--	0.01	--	--	--	0.57	320.17
Shortspine thornyhead (North of 34°27' N. lat.)	736.32	6.64	0.03	1.06	24.79	3.18	--	--	0.04	--	60.93	0.87	3.38	1.10	43.02	--	--	--	5.51	886.89
Shortspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	--	--	--	--	140.20	--	0.00	1.50	--	--	--	--	0.49	142.19
Spiny dogfish	146.92	6.92	0.17	101.66	108.19	31.70	5.56	0.17	0.01	0.38	68.01	0.22	0.16	0.27	7.28	0.21	0.01	2.98	16.05	496.86
Splitnose rockfish (South of 40°10' N. lat.)	12.54	--	--	--	--	--	--	--	2.88	0.02	0.08	--	0.02	--	--	--	--	--	11.17	26.69
Starry flounder	9.56	--	0.00	--	--	--	4.56	--	--	--	0.04	--	0.04	1.60	0.01	--	0.05	3.58	0.05	19.49
Widow rockfish	33.89	--	4,857.27	973.15	409.88	66.11	--	--	0.00	--	1.55	0.03	0.80	0.44	10.64	--	1.55	4.87	6.02	6,366.20
YELLOWEYE ROCKFISH	0.14	0.01	0.00	0.00	--	0.00	--	--	0.00	--	2.29	0.68	2.12	0.02	0.61	3.15	3.60	4.48	0.90	18.02
Yellowtail rockfish (North of 40°10' N. lat.)	199.74	0.16	953.70	1,305.09	130.22	147.93	--	--	0.00	--	1.13	0.08	1.28	1.80	244.34	49.74	13.78	0.51	10.10	3,059.60
Non-groundfish species																				
California halibut	--	--	--	--	--	--	116.44	--	--	2.09	1.63	--	0.53	154.14	--	--	0.07	129.90	--	404.79
Dungeness crab	171.96	1.36	0.10	0.00	--	--	114.54	--	0.00	--	4.57	0.02	2.21	21,865.66	1,376.48	--	--	--	0.00	23,536.91
Non-FMP flatfish																				
Deepsea Sole	5.82	0.00	--	--	--	--	--	--	0.11	--	0.03	--	--	--	--	--	--	--	--	5.96
Diamond Turbot	--	--	--	--	--	--	0.04	--	--	--	--	--	--	--	--	--	--	0.00	--	0.04
Hornyhead Turbot	--	--	--	--	--	--	1.37	0.16	--	1.73	--	--	--	0.01	--	--	--	--	--	3.26
Longfin Sanddab	--	--	--	--	--	--	0.25	0.15	0.00	1.78	--	--	--	--	--	--	--	0.00	0.00	2.18
Slender Sole	61.44	--	0.00	--	0.00	0.00	0.07	--	71.45	2.49	--	--	--	--	--	--	--	--	--	135.47
Speckled Sanddab	--	--	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	--	0.00	--	0.00
Other nongroundfish																				
Brown Irish Lord Sculpin	--	--	--	--	--	--	--	--	--	--	--	--	0.01	--	--	--	--	0.00	0.00	0.01
Buffalo Sculpin	--	--	--	--	--	--	--	--	--	--	--	--	0.17	--	--	--	0.01	0.02	--	0.20
California Sheephead	--	--	--	--	--	--	--	--	--	--	3.51	--	76.95	1.93	--	--	--	53.15	0.01	135.55
Red Irish Lord Sculpin	--	--	--	--	--	--	--	--	--	--	--	--	0.12	--	--	--	0.03	0.00	--	0.15
Sculpin Unid	0.76	--	0.00	--	--	--	0.05	0.08	0.20	0.10	0.00	--	0.15	0.20	--	--	0.00	0.00	--	1.54
Skate Unid	18.68	0.01	0.01	0.12	--	--	0.41	--	0.00	1.03	5.07	3.36	0.11	4.62	120.13	--	--	0.00	0.00	153.54
Squid Unid	1.57	--	0.05	18.03	170.87	28.24	--	--	--	--	0.02	--	--	10.83	0.04	--	--	--	0.07	229.72
Starry Skate	0.09	--	--	--	--	--	0.29	--	--	--	--	--	0.01	--	--	--	--	0.00	0.04	0.43

**Table 15 (continued).**

	Commercial fisheries														WA tribal shoreside	Recreational fishing mortality			Research	Estimated fishing mortality
	IFQ/Co-op Management						Non-IFQ													
	Bottom trawl	Fixed gear	Midwater rockfish	Shoreside midwater hake	At-sea midwater CP	At-sea midwater MSCV	OA CA halibut	Sea cucumber	Pink shrimp	Ridgeback prawn	Non- nearshore fixed gear	Pacific halibut derby	Nearshore fixed gear	Incidental fisheries		WA	OR	CA		
Shared ecosystem component species	--	--	--	--	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	--	0.00
Barracudina Unid	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01
Blacksmelt Unid	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
Bristlemouth Unid	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
Deepsea Smelt Unid	0.00	--	--	--	0.04	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	0.02
Duckbill Barracudina	--	--	--	--	0.69	0.02	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
Lanternfish Unid	0.00	--	--	--	0.47	0.00	--	--	0.02	--	--	--	--	--	--	--	--	--	--	0.03
Lightfish Unid	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
Non-Eulachon Smelt Unid	0.01	--	--	--	--	--	--	--	1.04	0.03	--	--	--	--	--	--	--	--	--	1.08
Non-Humboldt Squid Unid	11.75	0.00	0.09	0.07	--	--	0.03	0.00	6.08	0.36	--	--	--	--	--	--	--	--	--	18.37
Pacific Sandlance	--	--	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--	0.00
Pacific Saury	0.00	--	--	--	0.00	0.00	--	--	0.00	--	--	--	0.00	--	--	--	--	--	--	0.01
Round Herring	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.81	--	--	--	--	0.81
Slender Barracudina	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	0.81	--	--	--	--	0.00
Smelt Unid	--	2.16	--	--	--	--	--	--	--	--	0.05	--	--	135.17	0.00	--	--	--	--	137.38
Surf Smelt	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
White Barracudina	--	--	--	--	0.02	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	0.02
Whitebait Smelt	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00

**Table 16. Fishing Mortality Estimates Relative to Harvest Specifications.**

Estimated fishing mortality (mt) of major west coast groundfish species and corresponding management reference points (harvest specifications). Values which are greater than 90% to 100% relative to a management reference point are highlighted in yellow. Values which are greater than 100% relative to a management reference point are highlighted in red.

	Estimated fishing mortality (mt)	Management reference points (harvest specifications)					
		ACL (mt)	Estimated mortality (% of ACL)	ABC (mt)	Estimated mortality (% of ABC)	OFL (mt)	Estimated mortality (% of OFL)
Arrowtooth flounder	1,446	13,804	10	13,804	10	16,571	9
Big skate	260	494	53	494	53	541	48
Black rockfish (California)	151	334	45	334	45	349	43
Black rockfish (Oregon)	544	527	103	527	103	577	94
Black rockfish (Washington)	248	319	78	305	81	305	81
Bocaccio rockfish (South of 40°10' N. lat.)	225	790	28	2,044	11	2,139	11
Cabazon (California)	55	150	37	150	37	157	35
Cabazon (Oregon)	51	47	108	47	108	49	104
California scorpionfish (South of 34°27' N. lat.)	86	150	57	264	33	289	30
Canary rockfish	401	1,714	23	1,714	23	1,793	22
Chilepepper rockfish (South of 40°10' N. lat.)	128	2,607	5	2,607	5	2,727	5
COWCOD ROCKFISH (South of 40°10' N. lat.)	2	10	17	63	3	70	2
Darkblotched rockfish	238	641	37	641	37	671	35
Dover sole	7,547	50,000	15	85,755	9	89,702	8
English sole	349	9,964	4	9,964	4	10,914	3
Lingcod (North of 40°10' N. lat.)	1,167	3,333	35	3,333	35	3,549	33
Lingcod (South of 40°10' N. lat.)	539	1,251	43	1,251	43	1,502	36
Longnose skate	900	2,000	45	2,444	37	2,556	35
Minor rockfish (North of 40°10' N. lat.)	840	3,909	21	3,909	21	4,318	19
Nearshore	90	105	86	105	86	118	76
Shelf	320	2,049	16	2,049	16	2,303	14
Slope	430	1,755	25	1,755	25	1,897	23
Minor rockfish (South of 40°10' N. lat.)	1,398	3,493	40	3,508	40	4,073	34
Nearshore	713	1,163	61	1,166	61	1,329	54
Shelf	571	1,623	35	1,624	35	1,917	30
Slope	113	707	16	718	16	827	14
Other flatfish	1,003	8,510	12	8,510	12	11,165	9
Other groundfish	109	474	23	474	23	537	20
Pacific cod	159	1,600	10	2,221	7	3,200	5
Pacific hake	356,839	2017 US TAC = 441,433 mt, 81% of US TAC					
PACIFIC OCEAN PERCH (North of 40°10' N. lat.)	124	281	44	922	13	964	13
Petrale sole	2,944	3,136	94	3,136	94	3,280	90
Sablefish (North of 36° N. lat.)	5,346	5,252	102	7,350	79	8,050	72
Sablefish (South of 36° N. lat.)	465	1,864	25				
Shortbelly rockfish	320	500	64	5,789	6	6,950	5
Spiny dogfish	497	2,094	24	2,094	24	2,514	20
Splitnose rockfish (South of 40°10' N. lat.)	27	1,760	2	1,760	2	1,841	1
Starry flounder	19	1,282	2	1,282	2	1,847	1
Thornyheads							
Longspine Thornyhead (North of 34°27' N. lat.)	833	2,894	29				
Longspine Thornyhead (South of 34°27' N. lat.)	14	914	1	3,808	22	4,571	19
Shortspine Thornyhead (North of 34°27' N. lat.)	887	1,713	52				
Shortspine Thornyhead (South of 34°27' N. lat.)	142	906	16	2,619	39	3,144	33
Mixed thornyheads	2						
Widow rockfish	6,366	13,508	47	13,508	47	14,130	45
YELLOW EYE ROCKFISH	18	20	90	47	38	57	32
Yellowtail rockfish (North of 40°10' N. lat.)	3,060	6,196	49	6,196	49	6,786	45

## Appendix A

**Table A-1. Species identification codes used in the Pacific Coast Fisheries Information Network (PacFIN) database and assigned to WCGOP data.**

Species identification codes used in the PacFIN database and assigned to WCGOP observer data. Columns on the far right specify which species were defined as groundfish, as identified in the Pacific Coast Groundfish FMP, as nearshore species, as IFQ managed species or categories, or as rebuilding species in 2017.

PacFIN Species ID	PacFIN Common Name	IFQ Grouping	Limited Entry/Non-nearshore Species Group		Nearshore Fixed Gear Species Group		FMP Species	Nearshore Species	Rebuilding Species	IFQ Species
			North of 40° 10' N. latitude	South of 40° 10' N. latitude	North of 40° 10' N. latitude	South of 40° 10' N. latitude				
ART1	NOM. ARROWTOOTH FLOUNDER	Arrowtooth Flounder	Arrowtooth flounder	Arrowtooth flounder	Arrowtooth flounder	Arrowtooth flounder	X			X
ARTH	ARROWTOOTH FLOUNDER	Arrowtooth Flounder	Arrowtooth flounder	Arrowtooth flounder	Arrowtooth flounder	Arrowtooth flounder	X			X
CNR1	NOM. CANARY ROCKFISH	Canary Rockfish	Canary rockfish	Canary rockfish	Canary rockfish	Canary rockfish	X			X
CNRY	CANARY ROCKFISH	Canary Rockfish	Canary rockfish	Canary rockfish	Canary rockfish	Canary rockfish	X			X
RCK8	CANARY+VERMILION ROCKFISH	Canary Rockfish	Canary rockfish	Canary rockfish	Canary rockfish	Canary rockfish	X			X
DBR1	NOM. DARKBLOTCHED ROCKFISH	Darkblotched Rockfish	Darkblotched rockfish	Darkblotched rockfish	Darkblotched rockfish	Darkblotched rockfish	X			X
DBRK	DARKBLOTCHED ROCKFISH	Darkblotched Rockfish	Darkblotched rockfish	Darkblotched rockfish	Darkblotched rockfish	Darkblotched rockfish	X			X
DOVR	DOVER SOLE	Dover Sole	Dover sole	Dover sole	Dover sole	Dover sole	X			X
DVR1	NOM. DOVER SOLE	Dover Sole	Dover sole	Dover sole	Dover sole	Dover sole	X			X
EGL1	NOM. ENGLISH SOLE	English Sole	English sole	English sole	English sole	English sole	X			X
EGLS	ENGLISH SOLE	English Sole	English sole	English sole	English sole	English sole	X			X
LCD1	NOM. LINGCOD	Lingcod	Lingcod (North of 40°10' N. lat.)	Lingcod (South of 40°10' N. lat.)	Lingcod (North of 40°10' N. lat.)	Lingcod (South of 40°10' N. lat.)	X	X		X
LCOD	LINGCOD	Lingcod	Lingcod (North of 40°10' N. lat.)	Lingcod (South of 40°10' N. lat.)	Lingcod (North of 40°10' N. lat.)	Lingcod (South of 40°10' N. lat.)	X	X		X
LSP1	NOM. LONGSPINE THORNYHEAD	Longspine Thornyhead	Longspine thornyhead	Longspine thornyhead	Longspine thornyhead	Longspine thornyhead	X			X
LSPN	LONGSPINE THORNYHEAD	Longspine Thornyhead	Longspine thornyhead	Longspine thornyhead	Longspine thornyhead	Longspine thornyhead	X			X
RCK4	UNSP. REDS RCKFSH	Minor Rockfish	Other rockfish	Other rockfish	Other rockfish	Other rockfish	X	X		X
RCK5	UNSP. SMALL REDS RCKFSH	Minor Rockfish	Other rockfish	Other rockfish	Other rockfish	Other rockfish	X	X		X
RCK6	UNSP. ROSEFISH RCKFSH	Minor Rockfish	Other rockfish	Other rockfish	Other rockfish	Other rockfish	X	X		X
ODSR	OTHER DEMERSAL RCKFSH	Minor Rockfish	Other rockfish	Other rockfish	Other rockfish	Other rockfish	X	X		X
OPLG	OTHER PELAGIC RCKFSH	Minor Rockfish	Other rockfish	Other rockfish	Other rockfish	Other rockfish	X			X
RRCK	REMAINING ROCKFISH	Minor Rockfish	Other rockfish	Other rockfish	Other rockfish	Other rockfish	X	X		X
UDM1	UNSP. DEMERSAL-91	Minor Rockfish	Other rockfish	Other rockfish	Other rockfish	Other rockfish	X	X		X
UDSR	UNSP. DEMERSAL RCKFSH	Minor Rockfish	Other rockfish	Other rockfish	Other rockfish	Other rockfish	X	X		X
UPLG	UNSP. PELAGIC RCKFSH	Minor Rockfish	Other rockfish	Other rockfish	Other rockfish	Other rockfish	X			X
USR1	UNSP. SLOPE-91	Minor Rockfish	Other rockfish	Other rockfish	Other rockfish	Other rockfish	X			X
USR2	UNSP. SLOPE-93	Minor Rockfish	Other rockfish	Other rockfish	Other rockfish	Other rockfish	X			X
BCAC	BOCACCIO	Minor Shelf Rockfish	Minor shelf rockfish (North of 40°10' N. lat.)	Bocaccio rockfish (South of 40°10' N. lat.)	Minor shelf rockfish (North of 40°10' N. lat.)	Bocaccio rockfish (South of 40°10' N. lat.)	X			X
BCC1	NOM. BOCACCIO	Minor Shelf Rockfish	Minor shelf rockfish (North of 40°10' N. lat.)	Bocaccio rockfish (South of 40°10' N. lat.)	Minor shelf rockfish (North of 40°10' N. lat.)	Bocaccio rockfish (South of 40°10' N. lat.)	X			X
CLP1	NOM. CHILIPEPPER	Minor Shelf Rockfish	Minor shelf rockfish (North of 40°10' N. lat.)	Chilipepper rockfish (South of 40°10' N. lat.)	Minor shelf rockfish (North of 40°10' N. lat.)	Chilipepper rockfish (South of 40°10' N. lat.)	X			X
CLPR	CHILIPEPPER	Minor Shelf Rockfish	Minor shelf rockfish (North of 40°10' N. lat.)	Chilipepper rockfish (South of 40°10' N. lat.)	Minor shelf rockfish (North of 40°10' N. lat.)	Chilipepper rockfish (South of 40°10' N. lat.)	X			X
CWC1	NOM. COWCOD ROCKFISH	Minor Shelf Rockfish	Minor shelf rockfish (North of 40°10' N. lat.)	COWCOD ROCKFISH (South of 40°10' N. lat.)	Minor shelf rockfish (North of 40°10' N. lat.)	COWCOD ROCKFISH (South of 40°10' N. lat.)	X		X	X
CWCD	COWCOD ROCKFISH	Minor Shelf Rockfish	Minor shelf rockfish (North of 40°10' N. lat.)	COWCOD ROCKFISH (South of 40°10' N. lat.)	Minor shelf rockfish (North of 40°10' N. lat.)	COWCOD ROCKFISH (South of 40°10' N. lat.)	X		X	X
YTR1	NOM. YELLOWTAIL ROCKFISH	Minor Shelf Rockfish	Yellowtail rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	Yellowtail rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	X			X
YTRK	YELLOWTAIL ROCKFISH	Minor Shelf Rockfish	Yellowtail rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	Yellowtail rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	X			X
VRM1	NOM. VERMILION ROCKFISH	Minor Shelf Rockfish	Minor shelf rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	Minor shelf rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	X			X
VRML	VERMILION ROCKFISH	Minor Shelf Rockfish	Minor shelf rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	Minor shelf rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	X			X
NSLF	NORTHERN SHELF ROCKFISH	Minor Shelf Rockfish	Minor shelf rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	Minor shelf rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	X			X
NUSF	NOR. UNSP. SHELF ROCKFISH	Minor Shelf Rockfish	Minor shelf rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	Minor shelf rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	X			X
RCK1	BOCACCIO+CHILIPEPPER RCKFSH	Minor Shelf Rockfish	Minor shelf rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	Minor shelf rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	X			X
SSLF	SOUTHERN SHELF ROCKFISH	Minor Shelf Rockfish	Minor shelf rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	Minor shelf rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	X			X

**Table A-1 (continued).**[illegible]

**Table A-1 (continued).**[illegible]

**Table A-1 (continued).**

PacFIN Species ID	PacFIN Common Name	IFQ Grouping	Limited Entry/Non-nearshore Species Group		Nearshore Fixed Gear Species Group		FMP Species	Nearshore Species	Rebuilding Species	IFQ Species
			North of 40° 10' latitude	South of 40° 10' latitude	North of 40° 10' latitude	South of 40° 10' latitude				
BANK	BANK ROCKFISH	Minor Slope Rockfish	Minor slope rockfish (North of 40°10' N. lat.)	Minor slope rockfish (South of 40°10' N. lat.)	Minor slope rockfish (North of 40°10' N. lat.)	Minor slope rockfish (South of 40°10' N. lat.)	X			X
BNK1	NOM. BANK ROCKFISH	Minor Slope Rockfish	Minor slope rockfish (North of 40°10' N. lat.)	Minor slope rockfish (South of 40°10' N. lat.)	Minor slope rockfish (North of 40°10' N. lat.)	Minor slope rockfish (South of 40°10' N. lat.)	X			X
ARR1	NOM. AURORA ROCKFISH	Minor Slope Rockfish	Minor slope rockfish (North of 40°10' N. lat.)	Minor slope rockfish (South of 40°10' N. lat.)	Minor slope rockfish (North of 40°10' N. lat.)	Minor slope rockfish (South of 40°10' N. lat.)	X			X
ARRA	AURORA ROCKFISH	Minor Slope Rockfish	Minor slope rockfish (North of 40°10' N. lat.)	Minor slope rockfish (South of 40°10' N. lat.)	Minor slope rockfish (North of 40°10' N. lat.)	Minor slope rockfish (South of 40°10' N. lat.)	X			X
SNOS	SPLITNOSE ROCKFISH	Minor Slope Rockfish	Minor slope rockfish (North of 40°10' N. lat.)	Splitnose rockfish (South of 40°10' N. lat.)	Minor slope rockfish (North of 40°10' N. lat.)	Splitnose rockfish (South of 40°10' N. lat.)	X			X
SNS1	NOM. SPLITNOSE ROCKFISH	Minor Slope Rockfish	Minor slope rockfish (North of 40°10' N. lat.)	Splitnose rockfish (South of 40°10' N. lat.)	Minor slope rockfish (North of 40°10' N. lat.)	Splitnose rockfish (South of 40°10' N. lat.)	X			X
THD1	NOM. THORNYHEADS	Mixed Thornyhead	Mixed thornyheads	Mixed thornyheads	Mixed thornyheads	Mixed thornyheads	X			X
THDS	THORNYHEADS (MIXED)	Mixed Thornyhead	Mixed thornyheads	Mixed thornyheads	Mixed thornyheads	Mixed thornyheads	X			X
DFLT	UNSP. DEEP FLOUNDERS	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
SFLT	UNSP. SHALLOW FLOUNDERS	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
UDF1	UNSP. DEEP-91 FLOUNDERS	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
UDF2	UNSP. DEEP-95 FLOUNDERS	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
UFL1	FLOUNDERS (NO FSOL)	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
USF1	UNSP. SHALLOW-91 FLOUNDERS	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
SSO1	NOM. SAND SOLE	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
SSOL	SAND SOLE	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
RS1	NOM. ROCK SOLE	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
RSOL	ROCK SOLE	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
REX	REX SOLE	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
REX1	NOM. REX SOLE	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
CSL1	NOM. CURLFIN SOLE	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
CSOL	CURLFIN SOLE	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
BSOL	BUTTER SOLE	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
PDB	PACIFIC SANDDAB	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
PDB1	NOM. PACIFIC SANDDAB	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
UDAB	UNSP. SANDDABS	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
FSOL	FLATHEAD SOLE	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
OFLT	OTHER FLATFISH	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
RFLT	REMAINING FLATFISH	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
UFLT	UNSP. FLATFISH	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
UTRB	UNSP. TURBOTS	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
PCOD	PACIFIC COD	Pacific Cod	Pacific cod	Pacific cod	Pacific cod	Pacific cod	X			X
PWHT	PACIFIC WHITING	Pacific Hake	Pacific hake	Pacific hake	Pacific hake	Pacific hake	X			X
PTR1	NOM. PETRALE SOLE	Petrale Sole	Petrale sole	Petrale sole	Petrale sole	Petrale sole	X			X
PTRL	PETRALE SOLE	Petrale Sole	Petrale sole	Petrale sole	Petrale sole	Petrale sole	X			X
SABL	SABLEFISH	Sablefish	Sablefish	Sablefish	Sablefish	Sablefish	X			X
SSP1	NOM. SHORTSPINE THORNYHEAD	Shortspine Thornyhead	Shortspine thornyhead	Shortspine thornyhead	Shortspine thornyhead	Shortspine thornyhead	X			X
SSPN	SHORTSPINE THORNYHEAD	Shortspine Thornyhead	Shortspine thornyhead	Shortspine thornyhead	Shortspine thornyhead	Shortspine thornyhead	X			X
SFL1	NOM. STARRY FLOUNDER	Starry Flounder	Starry flounder	Starry flounder	Starry flounder	Starry flounder	X			X
STRY	STARRY FLOUNDER	Starry Flounder	Starry flounder	Starry flounder	Starry flounder	Starry flounder	X			X



**Table A-1 (continued).**

PacFIN Species ID	PacFIN Common Name	IFQ Grouping	Limited Entry/Non-nearshore Species Group		Nearshore Fixed Gear Species Group		FMP Species	Nearshore Species	Rebuilding Species	IFQ Species
			North of 40° 10' latitude	South of 40° 10' latitude	North of 40° 10' latitude	South of 40° 10' latitude				
WDOW	WIDOW ROCKFISH	Widow Rockfish	Widow rockfish	Widow rockfish	Widow rockfish	Widow rockfish	X			X
WDW1	NOM. WIDOW ROCKFISH	Widow Rockfish	Widow rockfish	Widow rockfish	Widow rockfish	Widow rockfish	X			X
YEW1	NOM. YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	X		X	X
YEW2	YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	X		X	X
RCK9	BLACK+BLUE ROCKFISH		Black rockfish	Black rockfish	Black rockfish	Black rockfish	X	X		
BLCK	BLACK ROCKFISH		Black rockfish	Black rockfish	Black rockfish	Black rockfish	X	X		
BLK1	NOM. BLACK ROCKFISH		Black rockfish	Black rockfish	Black rockfish	Black rockfish	X	X		
SCOR	CALIFORNIA SCORPIONFISH		California scorpionfish	California scorpionfish	California scorpionfish	California scorpionfish	X	X		
SCR1	NOM. CALIF. SCORPIONFISH		California scorpionfish	California scorpionfish	California scorpionfish	California scorpionfish	X	X		
RCK2	UNSP. BOLINA ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	X	X		
SSHR	SOUTHERN NEAR-SHORE ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	X	X		
SSRD	DEEP SO. NEAR-SHORE RF		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	X	X		
SUSR	SOU. UNSP. NEAR-SHORE ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	X	X		
UDNR	UNSP. DEEP NEAR-SHORE RF		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	X	X		
USHR	UNSP. NEAR-SHORE ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	X	X		
TRE1	NOM. TREEFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	X	X		
TREE	TREEFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	X	X		
QLB1	NOM. QUILLBACK ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	X	X		
QLBK	QUILLBACK ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	X	X		
OLV1	NOM. OLIVE ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	X	X		
OLVE	OLIVE ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	X	X		
COP1	NOM. COPPER ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	X	X		
COPP	COPPER ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	X	X		
CLC1	NOM. CALICO ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	X	X		
CLCO	CALICO ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	X	X		
BRW1	NOM. BROWN ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	X	X		
BRWN	BROWN ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	X	X		
BLU1	NOM. BLUE ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	X	X		
BLUR	BLUE ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	X	X		
DEAC	DEACON ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	X	X		
GRDR	UNSP. GRENADIERS		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	X			
RATF	SPOTTED RATFISH		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	X			
CSKT	CALIFORNIA SKATE		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	X			
BSKT	BIG SKATE		Big skate	Big skate	Big skate	Big skate	X			
BSK1	NOM. BIG SKATE		Big skate	Big skate	Big skate	Big skate	X			
SSRK	SOUPFIN SHARK		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	X			
AKSK	ALASKA SKATE		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	X			
ASKT	ALEUTIAN SKATE		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	X			
BLSK	BLACK SKATE		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	X			
RTSK	ROUGHTAIL SKATE		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	X			

**Table A-1 (continued).**

PacFIN Species ID	PacFIN Common Name	IFQ Grouping	Limited Entry/Non-nearshore Species Group		Nearshore Fixed Gear Species Group		FMP Species	Nearshore Species	Rebuilding Species	IFQ Species
			North of 40° 10' latitude	South of 40° 10' latitude	North of 40° 10' latitude	South of 40° 10' latitude				
GGRD	GIANT GRENADIER		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	X			
GRN	PACIFIC GRENADIER		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	X			
PFNS	PACIFIC FLATNOSE		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	X			
SPSK	SANDPAPER SKATE		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	X			
OGRN	OTHER GROUND FISH		Groundfish unid	Groundfish unid	Groundfish unid	Groundfish unid	X			
RGRN	REMAINING GROUND FISH		Groundfish unid	Groundfish unid	Groundfish unid	Groundfish unid	X			
UGRN	UNSP. GROUND FISH		Groundfish unid	Groundfish unid	Groundfish unid	Groundfish unid	X			
LSKT	LONGNOSE SKATE		Longnose skate	Longnose skate	Longnose skate	Longnose skate	X			
NSHR	NORTHERN NEAR-SHORE ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	X	X		
NUSR	NOR. UNSP. NEAR-SHORE ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	X	X		
KGL1	NOM. KELP GREENLING		Other groundfish	Other groundfish	Other groundfish	Other groundfish	X	X		
KLPG	KELP GREENLING		Other groundfish	Other groundfish	Other groundfish	Other groundfish	X	X		
CBZ1	NOM. CABEZON		Other groundfish	Other groundfish	Other groundfish	Other groundfish	X	X		
CBZN	CABEZON		Other groundfish	Other groundfish	Other groundfish	Other groundfish	X	X		
LSRK	LEOPARD SHARK		Other groundfish	Other groundfish	Other groundfish	Other groundfish	X			
UGLG	UNSP. GREENLING		Other groundfish	Other groundfish	Other groundfish	Other groundfish	X	X		
ORND	OTHER ROUND FISH		Roundfish unid	Roundfish unid	Roundfish unid	Roundfish unid	X			
RRND	REMAINING ROUND FISH		Roundfish unid	Roundfish unid	Roundfish unid	Roundfish unid	X			
URND	UNSP. ROUND FISH		Roundfish unid	Roundfish unid	Roundfish unid	Roundfish unid	X			
RCK7	UNSP. GOPHER ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Shallow nearshore rockfish	X	X		
SSHR	SOUTHERN NEAR-SHORE ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Shallow nearshore rockfish	X	X		
SSRS	Shallow So. Near-shore RF		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Shallow nearshore rockfish	X	X		
SUSR	SOU. UNSP. NEAR-SHORE ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Shallow nearshore rockfish	X	X		
USHR	UNSP. NEAR-SHORE ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Shallow nearshore rockfish	X	X		
KLP1	NOM. KELP ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Shallow nearshore rockfish	X	X		
KLPR	KELP ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Shallow nearshore rockfish	X	X		
GRAS	GRASS ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Shallow nearshore rockfish	X	X		
GRS1	NOM. GRASS ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Shallow nearshore rockfish	X	X		
GPH1	NOM. GOPHER ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Shallow nearshore rockfish	X	X		
GPHR	GOPHER ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Shallow nearshore rockfish	X	X		
CHN1	NOM. CHINA ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Shallow nearshore rockfish	X	X		
CHNA	CHINA ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Shallow nearshore rockfish	X	X		
BYEL	BLACK-AND-YELLOW ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Shallow nearshore rockfish	X	X		
BYL1	NOM. BLACK-AND-YELLOW ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Shallow nearshore rockfish	X	X		
SBL1	NOM. SHORTEBELLY ROCKFISH		Shorthead rockfish	Shorthead rockfish	Shorthead rockfish	Shorthead rockfish	X			
SBLY	SHORTEBELLY ROCKFISH		Shorthead rockfish	Shorthead rockfish	Shorthead rockfish	Shorthead rockfish	X			
DSRK	SPINY DOGFISH		Spiny dogfish	Spiny dogfish	Spiny dogfish	Spiny dogfish	X			
PHLB	PACIFIC HALIBUT	Pacific Halibut	Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				X
CHL1	NOM. CALIFORNIA HALIBUT		California halibut	California halibut	California halibut	California halibut				
CHLB	CALIFORNIA HALIBUT		California halibut	California halibut	California halibut	California halibut				

**Table A-1 (continued).**

PacFIN Species ID	PacFIN Common Name	IFQ Grouping	Limited Entry/Non-nearshore Species Group		Nearshore Fixed Gear Species Group		FMP Species	Nearshore Species	Rebuilding Species	IFQ Species
			North of 40° 10' latitude	South of 40° 10' latitude	North of 40° 10' latitude	South of 40° 10' latitude				
DCRB	DUNGENESS CRAB		Dungeness crab	Dungeness crab	Dungeness crab	Dungeness crab				
OSKT	OTHER SKATES		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
USKT	UNSP. SKATE		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
SSKT	STARRY SKATE		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
EULC	EULACHON		Eulachon	Eulachon	Eulachon	Eulachon				
ABLN	ALL ABALONE		--	--	--	--				
BASS	ALL BASS		--	--	--	--				
CLAM	ALL CLAMS		--	--	--	--				
CPEL	ALL COASTAL PELAGIC		--	--	--	--				
CRAB	ALL CRAB		--	--	--	--				
DEEP	DEEP-91 FLOUNDERS		--	--	--	--				
DRCK	DEMERSAL-91 RKFSH		--	--	--	--				
ECHN	ALL ECHINODERMS		--	--	--	--				
FLAT	ALL FLATFISH		--	--	--	--				
GRND	ALL GROUNDFISH		--	--	--	--				
HMSP	ALL HIGHLY MIGRATORY		--	--	--	--				
KCRB	ALL KING CRAB		--	--	--	--				
MGRN	MISC. GROUNDFISH		--	--	--	--				
MLSK	ALL MOLLUSKS		--	--	--	--				
NONE	*** NONE ***		--	--	--	--				
OBRK	OTHER BSA RKFSH		--	--	--	--				
OTHR	OTHER SPECIES (NO M-GROUP)		--	--	--	--				
OYST	ALL OYSTERS		--	--	--	--				
POPG	POP GROUP		--	--	--	--				
PRCK	PELAGIC ROCKFISH		--	--	--	--				
ROCK	ALL ROCKFISH		--	--	--	--				
ROND	ALL ROUNDFISH		--	--	--	--				
SAMN	ALL SALMON		--	--	--	--				
SBTS	ROCKFSH SUBTOTAL #1		--	--	--	--				
SCAL	ALL SCALLOPS		--	--	--	--				
SDAB	SANDDABS		--	--	--	--				
SHAL	SHALLOW-91 FLOUNDERS		--	--	--	--				
SHLL	ALL SHELLFISH		--	--	--	--				
SHRK	ALL SHARKS		--	--	--	--				
SKAT	ALL SKATES & RAYS		--	--	--	--				
SRCK	SLOPE-91 ROCKFISH		--	--	--	--				
SRKG	SHORTRAKER GROUP		--	--	--	--				
STRG	ALL STURGEON		--	--	--	--				
TCRB	ALL TANNER CRAB		--	--	--	--				
TRBT	TURBOTS		--	--	--	--				

**Table A-1 (continued).**

PacFIN Species ID	PacFIN Common Name	IFQ Grouping	Limited Entry/Non-nearshore Species Group		Nearshore Fixed Gear Species Group		FMP Species	Nearshore Species	Rebuilding Species	IFQ Species
			North of 40° 10' latitude	South of 40° 10' latitude	North of 40° 10' latitude	South of 40° 10' latitude				
TRNY	THORNYHEADS COMPLEX		--	--	--	--				
TUNA	ALL TUNAS		--	--	--	--				
WETF	ALL WET FISH		--	--	--	--				
XXXX	UNKNOWN SPECIES		--	--	--	--				
HTRB	HORNYHEAD TURBOT		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish				
GTRB	GREENLAND TURBOT		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish				
DTRB	DIAMOND TURBOT		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish				
KMKA	KAMCHATKA FLOUNDER		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish				
YSOL	YELLOWFIN SOLE		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish				
SLNS	SLENDER SOLE		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish				
FNTS	FANTAIL SOLE		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish				
DSOL	DEEPEA SOLE		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish				
CTRB	C-O SOLE		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish				
LDAB	LONGFIN SANDDAB		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish				
LDB1	NOM. LONGFIN SANDDAB		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish				
SDB1	NOM. SPECKLED SANDDAB		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish				
SSDB	SPECKLED SANDDAB		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish				
APLC	ALASKA PLAICE		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish				
BMO1	NOM. BIGMOUTH SOLE		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish				
BMOL	BIGMOUTH SOLE		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish				
STRB	SPOTTED TURBOT		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish				
SRMP	ALL SHRIMP & PRAWNS		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
PLCK	WALLEYE POLLOCK		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
CPLN	CAPELIN		Shared ecosystem component species	Shared ecosystem component species	Shared ecosystem component species	Shared ecosystem component species				
AMCK	ATKA MACKEREL		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
BSRM	UNSP. BAIT SHRIMP		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
GPRW	GOLDEN PRAWN		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
GSRM	GHOST SHRIMP		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
MSRM	MUD SHRIMP		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
OSRM	OTHER SHRIMP		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
PSHP	PINK SHRIMP		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
RPRW	RIDGEBACK PRAWN		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
RSRM	GRASS SHRIMP		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
SPRW	SPOTTED PRAWN		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
USRM	UNSP. OCEAN SHRIMP		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
BTCR	BAIRDI TANNER CRAB		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
UKCR	UNSP. KING CRAB		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
SKCR	SCARLET KING CRAB		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
RKCR	RED KING CRAB		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
GKCR	GOLDEN KING CRAB		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				

**Table A-1 (continued).**

PacFIN Species ID	PacFIN Common Name	IFQ Grouping	Limited Entry/Non-nearshore Species Group		Nearshore Fixed Gear Species Group		FMP Species	Nearshore Species	Rebuilding Species	IFQ Species
			North of 40° 10' latitude	South of 40° 10' latitude	North of 40° 10' latitude	South of 40° 10' latitude				
BKCR	BLUE KING CRAB		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
CCRB	OTHER CRAB		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
UCRB	UNSPECIFIED CRAB		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
RCRB	ROCK CRAB		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
USMN	UNSP. SALMON		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
STLH	STEELHEAD		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
SOCK	SOCKEYE SALMON		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
PINK	PINK SALMON		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
COHO	COHO SALMON		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
CHUM	CHUM SALMON		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
CHNK	CHINOOK SALMON		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
YLTL	YELLOWTAIL		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
OTNA	OTHER TUNA		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
UTNA	UNSPECIFIED TUNA		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
YTNA	YELLOWFIN TUNA		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
STNA	SKIPJACK TUNA		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
ETNA	BIGEYE TUNA		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
BTNA	BLUEFIN TUNA		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
BSJK	BLACK SKIPJACK		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
ALBC	ALBACORE		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
RHRG	ROUND HERRING		Shared ecosystem component species	Shared ecosystem component species	Shared ecosystem component species	Shared ecosystem component species				
PHRG	PACIFIC HERRING		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
WHOO	WAHOO		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
UMCK	UNSP. MACKEREL		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
JMCK	JACK MACKEREL		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
CMCK	CHUB MACKEREL		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
PSDN	PACIFIC SARDINE		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
PBNT	PACIFIC BONITO		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
OANC	OTHER ANCHOVY		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
NANC	NORTHERN ANCHOVY		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
MSHP	PLAINFIN MIDSHIPMAN		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
UHLB	UNSPECIFIED HALIBUT		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
OCRK	OTHER CROAKER		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
WCRK	WHITE CROAKER		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
OURC	OTHER SEA URCHINS		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
UURC	UNSP. SEA URCHINS		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
RURC	RED SEA URCHIN		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
OECH	OTHER ECHINODERM		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
UECH	UNSPECIFIED ECHINODERM		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
USCU	UNSP. SEA CUCUMBERS		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				

**Table A-1 (continued).**

PacFIN Species ID	PacFIN Common Name	IFQ Grouping	Limited Entry/Non-nearshore Species Group		Nearshore Fixed Gear Species Group		FMP Species	Nearshore Species	Rebuilding Species	IFQ Species
			North of 40° 10' latitude	South of 40° 10' latitude	North of 40° 10' latitude	South of 40° 10' latitude				
USTG	UNSP. STURGEON		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
WSTG	WHITE STURGEON		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
GSTG	GREEN STURGEON		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
WBAS	WHITE SEABASS		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
UHAG	UNSPECIFIED HAGFISH		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
TCOD	PACIFIC TOMCOD		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
SWRD	SWORDFISH		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
SSCL	SHARPNOSE SCULPIN		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
SFRP	SURFPERCH SPP.		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
SMLT	UNSP. SMELT		Shared ecosystem component species	Shared ecosystem component species	Shared ecosystem component species	Shared ecosystem component species				
SHP1	NOM. CALIFORNIA SHEEPHEAD		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish		X		
SHPD	CALIFORNIA SHEEPHEAD		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish		X		
SHAD	UNSPECIFIED SHAD		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
SCLP	UNSP. SCULPIN		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
SARY	PACIFIC SAURY		Shared ecosystem component species	Shared ecosystem component species	Shared ecosystem component species	Shared ecosystem component species				
SAIL	SAILFISH		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
RCKG	ROCK GREENLING		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
RGL1	NOM. ROCK GREENLING		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
QFSH	QUEENFISH		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
PROW	PROWFISH		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
POMF	PACIFIC POMFRET		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
PBTR	PACIFIC BUTTERFISH		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
OWFS	OCEAN WHITEFISH		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
OBAS	OTHER BASS		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
MRLN	STRIPED MARLIN		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
MOLA	COMMON MOLA		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
LUVR	LOUVAR		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
KFSH	GIANT KELPFISH		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
GBAS	GIANT SEA BASS		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
DRDO	DORADO		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
CUDA	PACIFIC BARRACUDA		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
BMRL	BLUE MARLIN		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
BMCK	BULLET MACKEREL		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
EELS	UNSPECIFIED EELS		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
CEEL	SPOTTED CUSK-EEL		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
WEEL	WOLF EEL		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
MEEL	MONKEYFACE EEL		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
OCTP	UNSP. OCTOPUS		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
SQID	UNSP. SQUID		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
MSQD	MARKET SQUID		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				

**Table A-1 (continued).**

PacFIN Species ID	PacFIN Common Name	IFQ Grouping	Limited Entry/Non-nearshore Species Group		Nearshore Fixed Gear Species Group		FMP Species	Nearshore Species	Rebuilding Species	IFQ Species
			North of 40° 10' latitude	South of 40° 10' latitude	North of 40° 10' latitude	South of 40° 10' latitude				
GSQD	GIANT SQUID		Shared ecosystem component species	Shared ecosystem component species	Shared ecosystem component species	Shared ecosystem component species				
UJEL	UNSP. JELLYFISH		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
BTRY	BAT RAY		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
OSRK	OTHER SHARK		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
USRK	UNSP. SHARK		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
ASRK	PACIFIC ANGEL SHARK		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
TSRK	COMMON THRESHER SHARK		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
PSRK	PELAGIC THRESHER SHARK		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
MAKO	SHORTFIN MAKO SHARK		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
ISRK	BIGEYE THRESHER SHARK		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
BSRK	BLUE SHARK		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
OCLM	OTHER CLAM		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
UCLM	UNSPECIFIED CLAM		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
WCLM	WASHINGTON CLAM		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
SCLM	SOFT-SHELLED CLAM		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
RZCL	ROSY RAZOR CLAM		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
RCLM	RAZOR CLAM		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
QCLM	NORTHERN QUAHOG CLAM		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
PRCL	PURPLE CLAM		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
PCLM	PISMO CLAM		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
MCLM	MANILA CLAM		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
MACL	MUD CLAMS		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
LCLM	NATIVE LITTLENECK		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
JCLM	CALIFORNIA JACKKNIFE CLAM		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
HCLM	HORSE CLAMS		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
GDUK	GEODUCK		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
GCLM	GAPER CLAM		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
CMSL	CALIFORNIA MUSSEL		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
CKLE	BASKET COCKLE		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
BMSL	BLUE OR BAY MUSSEL		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
BCLM	BUTTER CLAM		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
OSTR	OTHER OYSTER		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
USTR	UNSPECIFIED OYSTER		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
PSTR	PACIFIC OYSTER		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
LSTR	OLYMPIA OYSTER		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
KSTR	KUMAMOTO OYSTER		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
EURO	EUROPEAN OYSTER		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
ESTR	EASTERN OYSTER		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
OABL	OTHER ABALONE		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
UABL	UNSPECIFIED ABALONE		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				

**Table A-1 (continued).**

PacFIN Common Name	IFQ Grouping	Limited Entry/Non-nearshore Species Group		Nearshore Fixed Gear Species Group		FMP Species	Nearshore Species	Rebuilding Species	IFQ Species
		North of 40° 10' latitude	South of 40° 10' latitude	North of 40° 10' latitude	South of 40° 10' latitude				
WHITE ABALONE		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
RED ABALONE		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
PINK ABALONE		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
GREEN ABALONE		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
BLACK ABALONE		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
OTHER SCALLOP		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
UNSPECIFIED SCALLOP		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
OTHER MOLLUSKS		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
UNSPECIFIED MOLLUSKS		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
CALIF. SPINY LOBSTER		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
MISC. FISH/ANIMALS		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
MISCELLANEOUS FISH		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
BLACK HAGFISH		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
BROWN IRISH LORD		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish		X		
BLACK EELPOUT		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
BUFFALO SCULPIN		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish		X		
CALIFORNIA SLICKHEAD		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
BROWN CAT SHARK		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
PACIFIC HAGFISH		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
RED IRISH LORD		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish		X		
SHORTBILL SPEARFISH		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
VARNISH CLAM		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
SKILFISH		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
OPILO TANNER CRAB		Tanner crab	Tanner crab	Tanner crab	Tanner crab				
UNSP. TANNER CRAB		Tanner crab	Tanner crab	Tanner crab	Tanner crab				
OPAH		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
HUMBOLT SQUID		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				



**Table A-2. Species belonging to each WCGOP unsampled IFQ catch category.**

Species belonging to each WCGOP unsampled IFQ catch category. The IFQM catch category includes all 2016 IFQ species, and the NIFQ category includes all fish species except 2016 IFQ species.

IFQFF	IFQRF	IFQRD
Arrowtooth Flounder	Aurora Rockfish	Lingcod
Butter Sole	Bank Rockfish	Pacific Cod
Curlfin Turbot	Blackgill Rockfish	Pacific Hake
Dover Sole	Bocaccio Rockfish	Sablefish
English Sole	Canary Rockfish	
Flatfish Unid	Chilipepper Rockfish	
Flathead Sole	Cowcod Rockfish	
Pacific Halibut	Darkblotched Rockfish	
Pacific Sanddab	Flag Rockfish	
Petrale Sole	Greenspotted Rockfish	
Rex Sole	Greenstriped Rockfish	
Rock Sole	Halfbanded Rockfish	
Sand Sole	Harlequin Rockfish	
Sanddab Unid	Longspine Thornyhead	
Starry Flounder	Pacific Ocean Perch	
	Pygmy Rockfish	
	Redbanded Rockfish	
	Redstripe Rockfish	
	Rockfish Unid	
	Rosethorn Rockfish	
	Rosy Rockfish	
	Rougheye Rockfish	
	Sharpchin Rockfish	
	Shortraker Rockfish	
	Shortspine Thornyhead	
	Silvergray Rockfish	
	Splitnose Rockfish	
	Spotted Rockfish Unid	
	Squarespot Rockfish	
	Starry Rockfish	
	Stripetail Rockfish	
	Widow Rockfish	
	Yelloweye Rockfish	
	Yellowmouth Rockfish	
	Yellowtail Rockfish	

**Table A-3. Mortality rates applied in bottom trawl and fixed gear fisheries.**

Unlisted species were assumed to have 100% mortality rate. Rates are provided by the GMT.

Species	Fishery	Gear	Discard Mortality Rate
Big Skate	California Halibut	Trawl	50%
	IFQ Bottom Trawl	Trawl	50%
	LE Bottom Trawl	Trawl	50%
Lingcod	California Halibut	Trawl	50%
	IFQ Bottom Trawl	Trawl	50%
	IFQ Fixed Gear	Line	7%
	LE Bottom Trawl	Trawl	50%
	Non-Nearshore Fixed Gear	Line	7%
	Pacific Halibut Derby	Line	7%
Longnose Skate	California Halibut	Trawl	50%
	IFQ Bottom Trawl	Trawl	50%
	IFQ Fixed Gear	Line and Pot	50%
	LE Bottom Trawl	Trawl	50%
	Non-Nearshore Fixed Gear	Line and Pot	50%
	Pacific Halibut Derby	Line	50%
Sablefish	California Halibut	Trawl	50%
	IFQ Bottom Trawl	Trawl	50%
	IFQ Fixed Gear	Line and Pot	20%
	LE Bottom Trawl	Trawl	50%
	Non-Nearshore Fixed Gear	Line and Pot	20%
	Pacific Halibut Derby	Line	20%
Spiny Dogfish Shark	IFQ Fixed Gear	Line	50%
	Non-Nearshore Fixed Gear	Line	50%
	Pacific Halibut Derby	Line	50%

**Table A-4. Depth-dependent mortality rates applied in the Nearshore Fixed Gear fishery.**

Unlisted species were assumed to have 100% mortality rate or were not observed in the given strata across all years of WCGOP data. Rates are provided by the GMT and were updated in June 2017.

Nearshore Grouping	Species	Area Compared to 40° 10' N. latitude	Depth (fm)	Discard Mortality Rate
Big skate	Big Skate	SOUTH	10-20 fm	0.07
Black rockfish (California)	Black Rockfish	NORTH	0-10 fm	0.18
Black rockfish (California)	Black Rockfish	NORTH	10-20 fm	0.28
Black rockfish (California)	Black Rockfish	NORTH	20-30 fm	0.46
Black rockfish (California)	Black Rockfish	NORTH	>30 fm	0.63
Black rockfish (California)	Black Rockfish	SOUTH	0-10 fm	0.53
Black rockfish (California)	Black Rockfish	SOUTH	10-20 fm	0.63
Black rockfish (California)	Black Rockfish	SOUTH	20-30 fm	0.69
Black rockfish (California)	Black Rockfish	SOUTH	>30 fm	0.96
Black rockfish (Oregon)	Black Rockfish	NORTH	0-10 fm	0.18
Black rockfish (Oregon)	Black Rockfish	NORTH	10-20 fm	0.28
Black rockfish (Oregon)	Black Rockfish	NORTH	20-30 fm	0.46
Black rockfish (Oregon)	Black Rockfish	NORTH	>30 fm	0.63
Bocaccio rockfish (South of 40°10' N. lat.)	Bocaccio Rockfish	SOUTH	10-20 fm	0.68
Bocaccio rockfish (South of 40°10' N. lat.)	Bocaccio Rockfish	SOUTH	>30 fm	1
Cabazon (California)	Cabazon	NORTH	0-10 fm	0.07
Cabazon (California)	Cabazon	NORTH	10-20 fm	0.07
Cabazon (California)	Cabazon	NORTH	20-30 fm	0.07
Cabazon (California)	Cabazon	SOUTH	0-10 fm	0.07
Cabazon (California)	Cabazon	SOUTH	10-20 fm	0.07
Cabazon (California)	Cabazon	SOUTH	20-30 fm	0.07
Cabazon (California)	Cabazon	SOUTH	>30 fm	0.07
Cabazon (Oregon)	Cabazon	NORTH	0-10 fm	0.07
Cabazon (Oregon)	Cabazon	NORTH	10-20 fm	0.07
Cabazon (Oregon)	Cabazon	NORTH	20-30 fm	0.07
Cabazon (Oregon)	Cabazon	NORTH	>30 fm	0.07
California scorpionfish (North of 34°27' N. lat.)	California Scorpionfish	SOUTH	0-10 fm	0.07
California scorpionfish (South of 34°27' N. lat.)	California Scorpionfish	SOUTH	0-10 fm	0.07
California scorpionfish (South of 34°27' N. lat.)	California Scorpionfish	SOUTH	10-20 fm	0.07
California scorpionfish (South of 34°27' N. lat.)	California Scorpionfish	SOUTH	20-30 fm	0.07
California scorpionfish (South of 34°27' N. lat.)	California Scorpionfish	SOUTH	>30 fm	0.07
Canary rockfish	Canary Rockfish	NORTH	0-10 fm	0.27
Canary rockfish	Canary Rockfish	NORTH	10-20 fm	0.43
Canary rockfish	Canary Rockfish	NORTH	20-30 fm	0.65
Canary rockfish	Canary Rockfish	NORTH	>30 fm	1
Canary rockfish	Canary Rockfish	SOUTH	0-10 fm	0.58
Canary rockfish	Canary Rockfish	SOUTH	10-20 fm	0.71
Canary rockfish	Canary Rockfish	SOUTH	20-30 fm	0.79
Canary rockfish	Canary Rockfish	SOUTH	>30 fm	1
Deeper nearshore rockfish	Blue/Deacon Rockfish	SOUTH	0-10 fm	0.57
Deeper nearshore rockfish	Blue/Deacon Rockfish	SOUTH	10-20 fm	0.67
Deeper nearshore rockfish	Blue/Deacon Rockfish	SOUTH	20-30 fm	0.75
Deeper nearshore rockfish	Blue/Deacon Rockfish	SOUTH	>30 fm	1
Deeper nearshore rockfish	Brown Rockfish	SOUTH	0-10 fm	0.54
Deeper nearshore rockfish	Brown Rockfish	SOUTH	10-20 fm	0.64
Deeper nearshore rockfish	Brown Rockfish	SOUTH	20-30 fm	0.71
Deeper nearshore rockfish	Brown Rockfish	SOUTH	>30 fm	1
Deeper nearshore rockfish	Calico Rockfish	SOUTH	0-10 fm	0.6
Deeper nearshore rockfish	Calico Rockfish	SOUTH	10-20 fm	0.73
Deeper nearshore rockfish	Calico Rockfish	SOUTH	20-30 fm	0.82

**Table A-4 (continued).**

<b>Nearshore Grouping</b>	<b>Species</b>	<b>Area Compared to 40° 10' N. latitude</b>	<b>Depth (fm)</b>	<b>Discard Mortality Rate</b>
Deeper nearshore rockfish	Calico Rockfish	SOUTH	>30 fm	1
Deeper nearshore rockfish	Copper Rockfish	SOUTH	0-10 fm	0.57
Deeper nearshore rockfish	Copper Rockfish	SOUTH	10-20 fm	0.69
Deeper nearshore rockfish	Copper Rockfish	SOUTH	20-30 fm	0.77
Deeper nearshore rockfish	Copper Rockfish	SOUTH	>30 fm	1
Deeper nearshore rockfish	Olive Rockfish	SOUTH	0-10 fm	0.65
Deeper nearshore rockfish	Olive Rockfish	SOUTH	10-20 fm	0.74
Deeper nearshore rockfish	Olive Rockfish	SOUTH	20-30 fm	0.81
Deeper nearshore rockfish	Olive Rockfish	SOUTH	>30 fm	1
Deeper nearshore rockfish	Quillback Rockfish	SOUTH	0-10 fm	0.58
Deeper nearshore rockfish	Quillback Rockfish	SOUTH	10-20 fm	0.7
Deeper nearshore rockfish	Quillback Rockfish	SOUTH	20-30 fm	0.79
Deeper nearshore rockfish	Treefish Rockfish	SOUTH	0-10 fm	0.55
Deeper nearshore rockfish	Treefish Rockfish	SOUTH	10-20 fm	0.65
Deeper nearshore rockfish	Treefish Rockfish	SOUTH	20-30 fm	0.73
Deeper nearshore rockfish	Treefish Rockfish	SOUTH	>30 fm	1
Ecosystem component species	California Skate	SOUTH	0-10 fm	0.07
Ecosystem component species	California Skate	SOUTH	10-20 fm	0.07
Ecosystem component species	California Skate	SOUTH	20-30 fm	0.07
Ecosystem component species	California Skate	SOUTH	>30 fm	0.07
Ecosystem component species	Sandpaper Skate	NORTH	0-10 fm	0.07
Ecosystem component species	Soupfin Shark	NORTH	20-30 fm	0.07
Ecosystem component species	Soupfin Shark	SOUTH	>30 fm	0.07
Ecosystem component species	Spotted Ratfish	NORTH	0-10 fm	0.07
Ecosystem component species	Spotted Ratfish	NORTH	10-20 fm	0.07
Ecosystem component species	Spotted Ratfish	NORTH	20-30 fm	0.07
Ecosystem component species	Spotted Ratfish	SOUTH	10-20 fm	0.07
Ecosystem component species	Spotted Ratfish	SOUTH	20-30 fm	0.07
Ecosystem component species	Spotted Ratfish	SOUTH	>30 fm	0.07
English sole	English Sole	SOUTH	>30 fm	0.07
Lingcod (North of 40°10' N. lat.)	Lingcod	NORTH	0-10 fm	0.07
Lingcod (North of 40°10' N. lat.)	Lingcod	NORTH	10-20 fm	0.07
Lingcod (North of 40°10' N. lat.)	Lingcod	NORTH	20-30 fm	0.07
Lingcod (North of 40°10' N. lat.)	Lingcod	NORTH	>30 fm	0.07
Lingcod (South of 40°10' N. lat.)	Lingcod	SOUTH	0-10 fm	0.07
Lingcod (South of 40°10' N. lat.)	Lingcod	SOUTH	10-20 fm	0.07
Lingcod (South of 40°10' N. lat.)	Lingcod	SOUTH	20-30 fm	0.07
Lingcod (South of 40°10' N. lat.)	Lingcod	SOUTH	>30 fm	0.07
Longnose skate	Longnose Skate	NORTH	0-10 fm	0.07
Longnose skate	Longnose Skate	NORTH	10-20 fm	0.07
Longnose skate	Longnose Skate	SOUTH	10-20 fm	0.07
Minor nearshore rockfish (North of 40°10' N. lat.)	Black and Yellow Rockfish	NORTH	0-10 fm	0.2
Minor nearshore rockfish (North of 40°10' N. lat.)	Black and Yellow Rockfish	NORTH	10-20 fm	0.31
Minor nearshore rockfish (North of 40°10' N. lat.)	Black and Yellow Rockfish	NORTH	20-30 fm	0.52
Minor nearshore rockfish (North of 40°10' N. lat.)	Blue/Deacon Rockfish	NORTH	0-10 fm	0.25
Minor nearshore rockfish (North of 40°10' N. lat.)	Blue/Deacon Rockfish	NORTH	10-20 fm	0.37
Minor nearshore rockfish (North of 40°10' N. lat.)	Blue/Deacon Rockfish	NORTH	20-30 fm	0.57
Minor nearshore rockfish (North of 40°10' N. lat.)	Blue/Deacon Rockfish	NORTH	>30 fm	1
Minor nearshore rockfish (North of 40°10' N. lat.)	Brown Rockfish	NORTH	0-10 fm	0.19
Minor nearshore rockfish (North of 40°10' N. lat.)	Brown Rockfish	NORTH	10-20 fm	0.3

**Table A-4 (continued).**

Nearshore Grouping	Species	Area Compared to 40° 10' N. latitude	Depth (fm)	Discard Mortality Rate
Minor nearshore rockfish (North of 40°10' N. lat.)	China Rockfish	NORTH	0-10 fm	0.2
Minor nearshore rockfish (North of 40°10' N. lat.)	China Rockfish	NORTH	10-20 fm	0.31
Minor nearshore rockfish (North of 40°10' N. lat.)	China Rockfish	NORTH	20-30 fm	0.52
Minor nearshore rockfish (North of 40°10' N. lat.)	China Rockfish	NORTH	>30 fm	1
Minor nearshore rockfish (North of 40°10' N. lat.)	Copper Rockfish	NORTH	0-10 fm	0.26
Minor nearshore rockfish (North of 40°10' N. lat.)	Copper Rockfish	NORTH	10-20 fm	0.4
Minor nearshore rockfish (North of 40°10' N. lat.)	Copper Rockfish	NORTH	20-30 fm	0.61
Minor nearshore rockfish (North of 40°10' N. lat.)	Gopher Rockfish	NORTH	0-10 fm	0.26
Minor nearshore rockfish (North of 40°10' N. lat.)	Gopher Rockfish	NORTH	10-20 fm	0.4
Minor nearshore rockfish (North of 40°10' N. lat.)	Grass Rockfish	NORTH	0-10 fm	0.29
Minor nearshore rockfish (North of 40°10' N. lat.)	Olive Rockfish	NORTH	0-10 fm	0.39
Minor nearshore rockfish (North of 40°10' N. lat.)	Olive Rockfish	NORTH	10-20 fm	0.5
Minor nearshore rockfish (North of 40°10' N. lat.)	Olive Rockfish	NORTH	20-30 fm	0.68
Minor nearshore rockfish (North of 40°10' N. lat.)	Olive Rockfish	NORTH	>30 fm	1
Minor nearshore rockfish (North of 40°10' N. lat.)	Quillback Rockfish	NORTH	0-10 fm	0.27
Minor nearshore rockfish (North of 40°10' N. lat.)	Quillback Rockfish	NORTH	10-20 fm	0.41
Minor nearshore rockfish (North of 40°10' N. lat.)	Quillback Rockfish	NORTH	20-30 fm	0.64
Minor nearshore rockfish (North of 40°10' N. lat.)	Quillback Rockfish	NORTH	>30 fm	1
Minor shelf rockfish (North of 40°10' N. lat.)	Tiger Rockfish	NORTH	10-20 fm	0.41
Minor shelf rockfish (North of 40°10' N. lat.)	Tiger Rockfish	NORTH	20-30 fm	0.63
Minor shelf rockfish (North of 40°10' N. lat.)	Vermilion Rockfish	NORTH	0-10 fm	0.26
Minor shelf rockfish (North of 40°10' N. lat.)	Vermilion Rockfish	NORTH	10-20 fm	0.4
Minor shelf rockfish (North of 40°10' N. lat.)	Vermilion Rockfish	NORTH	20-30 fm	0.62
Minor shelf rockfish (North of 40°10' N. lat.)	Vermilion Rockfish	NORTH	>30 fm	1
Minor shelf rockfish (South of 40°10' N. lat.)	Vermilion Rockfish	SOUTH	0-10 fm	0.58
Minor shelf rockfish (South of 40°10' N. lat.)	Vermilion Rockfish	SOUTH	10-20 fm	0.69
Minor shelf rockfish (South of 40°10' N. lat.)	Vermilion Rockfish	SOUTH	20-30 fm	0.78
Minor shelf rockfish (South of 40°10' N. lat.)	Vermilion Rockfish	SOUTH	>30 fm	1
Minor shelf rockfish (South of 40°10' N. lat.)	Yellowtail Rockfish	SOUTH	0-10 fm	0.53
Minor shelf rockfish (South of 40°10' N. lat.)	Yellowtail Rockfish	SOUTH	10-20 fm	0.61
Minor shelf rockfish (South of 40°10' N. lat.)	Yellowtail Rockfish	SOUTH	20-30 fm	0.67
Minor shelf rockfish (South of 40°10' N. lat.)	Yellowtail Rockfish	SOUTH	>30 fm	0.94
Other flatfish	Butter Sole	NORTH	0-10 fm	0.07
Other flatfish	Butter Sole	NORTH	10-20 fm	0.07
Other flatfish	Butter Sole	SOUTH	20-30 fm	0.07
Other flatfish	Flatfish Unid	NORTH	10-20 fm	0.07
Other flatfish	Flatfish Unid	SOUTH	>30 fm	0.07
Other flatfish	Pacific Sanddab	NORTH	10-20 fm	0.07
Other flatfish	Pacific Sanddab	SOUTH	0-10 fm	0.07
Other flatfish	Pacific Sanddab	SOUTH	10-20 fm	0.07
Other flatfish	Pacific Sanddab	SOUTH	20-30 fm	0.07
Other flatfish	Pacific Sanddab	SOUTH	>30 fm	0.07
Other flatfish	Rock Sole	NORTH	0-10 fm	0.07
Other flatfish	Rock Sole	NORTH	10-20 fm	0.07
Other flatfish	Rock Sole	NORTH	20-30 fm	0.07
Other flatfish	Rock Sole	SOUTH	0-10 fm	0.07
Other flatfish	Rock Sole	SOUTH	10-20 fm	0.07
Other flatfish	Rock Sole	SOUTH	20-30 fm	0.07
Other flatfish	Sand Sole	NORTH	0-10 fm	0.07
Other flatfish	Sand Sole	NORTH	10-20 fm	0.07

**Table A-4 (continued).**

<b>Nearshore Grouping</b>	<b>Species</b>	<b>Area Compared to 40° 10' N. latitude</b>	<b>Depth (fm)</b>	<b>Discard Mortality Rate</b>
Other flatfish	Sand Sole	SOUTH	0-10 fm	0.07
Other flatfish	Sand Sole	SOUTH	10-20 fm	0.07
Other flatfish	Sand Sole	SOUTH	20-30 fm	0.07
Other flatfish	Sanddab Unid	NORTH	10-20 fm	0.07
Other flatfish	Sanddab Unid	SOUTH	0-10 fm	0.07
Other flatfish	Sanddab Unid	SOUTH	10-20 fm	0.07
Other flatfish	Sanddab Unid	SOUTH	>30 fm	0.07
Other groundfish	Greenling Unid	NORTH	0-10 fm	0.07
Other groundfish	Greenling Unid	NORTH	10-20 fm	0.07
Other groundfish	Greenling Unid	SOUTH	0-10 fm	0.07
Other groundfish	Greenling Unid	SOUTH	10-20 fm	0.07
Other groundfish	Greenling Unid	SOUTH	20-30 fm	0.07
Other groundfish	Kelp Greenling (California)	NORTH	0-10 fm	0.07
Other groundfish	Kelp Greenling (California)	NORTH	10-20 fm	0.07
Other groundfish	Kelp Greenling (California)	NORTH	20-30 fm	0.07
Other groundfish	Kelp Greenling (California)	NORTH	>30 fm	0.07
Other groundfish	Kelp Greenling (California)	SOUTH	0-10 fm	0.07
Other groundfish	Kelp Greenling (California)	SOUTH	10-20 fm	0.07
Other groundfish	Kelp Greenling (California)	SOUTH	20-30 fm	0.07
Other groundfish	Kelp Greenling (California)	SOUTH	>30 fm	0.07
Other groundfish	Kelp Greenling (Oregon)	NORTH	0-10 fm	0.07
Other groundfish	Kelp Greenling (Oregon)	NORTH	10-20 fm	0.07
Other groundfish	Kelp Greenling (Oregon)	NORTH	20-30 fm	0.07
Other groundfish	Kelp Greenling (Oregon)	NORTH	>30 fm	0.07
Other groundfish	Leopard Shark	SOUTH	0-10 fm	0.07
Other groundfish	Leopard Shark	SOUTH	10-20 fm	0.07
Other nongroundfish	Pacific Halibut	NORTH	0-10 fm	0.07
Other nongroundfish	Pacific Halibut	NORTH	10-20 fm	0.07
Other nongroundfish	Pacific Halibut	NORTH	20-30 fm	0.07
Petrale sole	Petrale Sole	NORTH	10-20 fm	0.07
Petrale sole	Petrale Sole	SOUTH	10-20 fm	0.07
Petrale sole	Petrale Sole	SOUTH	20-30 fm	0.07
Shallow nearshore rockfish	Black and Yellow Rockfish	SOUTH	0-10 fm	0.54
Shallow nearshore rockfish	Black and Yellow Rockfish	SOUTH	10-20 fm	0.65
Shallow nearshore rockfish	Black and Yellow Rockfish	SOUTH	>30 fm	1
Shallow nearshore rockfish	China Rockfish	SOUTH	0-10 fm	0.54
Shallow nearshore rockfish	China Rockfish	SOUTH	10-20 fm	0.65
Shallow nearshore rockfish	China Rockfish	SOUTH	20-30 fm	0.72
Shallow nearshore rockfish	China Rockfish	SOUTH	>30 fm	1
Shallow nearshore rockfish	Gopher Rockfish	SOUTH	0-10 fm	0.57
Shallow nearshore rockfish	Gopher Rockfish	SOUTH	10-20 fm	0.69
Shallow nearshore rockfish	Gopher Rockfish	SOUTH	20-30 fm	0.78
Shallow nearshore rockfish	Gopher Rockfish	SOUTH	>30 fm	1
Shallow nearshore rockfish	Grass Rockfish	SOUTH	0-10 fm	0.59
Shallow nearshore rockfish	Grass Rockfish	SOUTH	10-20 fm	0.74
Shallow nearshore rockfish	Kelp Rockfish	SOUTH	0-10 fm	0.53
Shallow nearshore rockfish	Kelp Rockfish	SOUTH	10-20 fm	0.62
Shallow nearshore rockfish	Kelp Rockfish	SOUTH	20-30 fm	0.69
Spiny dogfish	Spiny Dogfish Shark	NORTH	0-10 fm	0.07
Spiny dogfish	Spiny Dogfish Shark	NORTH	10-20 fm	0.07

**Table A-4 (continued).**

Nearshore Grouping	Species	Area Compared to 40° 10' N. latitude	Depth (fm)	Discard Mortality Rate
Spiny dogfish	Spiny Dogfish Shark	SOUTH	0-10 fm	0.07
Spiny dogfish	Spiny Dogfish Shark	SOUTH	10-20 fm	0.07
Spiny dogfish	Spiny Dogfish Shark	SOUTH	20-30 fm	0.07
Spiny dogfish	Spiny Dogfish Shark	SOUTH	>30 fm	0.07
Starry flounder	Starry Flounder	SOUTH	0-10 fm	0.07
Widow rockfish	Widow Rockfish	NORTH	0-10 fm	0.27
Widow rockfish	Widow Rockfish	NORTH	10-20 fm	0.42
Widow rockfish	Widow Rockfish	NORTH	20-30 fm	0.64
Widow rockfish	Widow Rockfish	SOUTH	10-20 fm	0.7
Widow rockfish	Widow Rockfish	SOUTH	20-30 fm	0.79
Widow rockfish	Widow Rockfish	SOUTH	>30 fm	1
YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	NORTH	0-10 fm	0.28
YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	NORTH	10-20 fm	0.45
YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	NORTH	20-30 fm	0.67
YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	NORTH	>30 fm	1
YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	SOUTH	10-20 fm	0.72
YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	SOUTH	20-30 fm	0.81
Yellowtail rockfish (North of 40°10' N. lat.)	Yellowtail Rockfish	NORTH	0-10 fm	0.17
Yellowtail rockfish (North of 40°10' N. lat.)	Yellowtail Rockfish	NORTH	10-20 fm	0.25
Yellowtail rockfish (North of 40°10' N. lat.)	Yellowtail Rockfish	NORTH	20-30 fm	0.43
Yellowtail rockfish (North of 40°10' N. lat.)	Yellowtail Rockfish	NORTH	>30 fm	0.5

**Table A-5. Updates to analysis used in this report.**

Year	Estimation Updates	Mortality Rate Updates	Management Updates
2017	Discards estimated in newly observed sectors (sea cucumber, ridgeback prawn, Pacific halibut derby).	Mortality rates applied to non-nearshore fixed gear line also applied to Pacific halibut derby line	Big skate removed from "Ecosystem Component Species" and managed separately. Black rockfish managed at state level. Bocaccio rockfish, darklotched rockfish, Pacific Ocean perch declared rebuilt.
2016	Definitions of EFP, nearshore, and pink shrimp sectors improved. Nearshore estimation based on 4 depth bins. EM CS fleet at-sea discard methods improved and shoreside discard estimate methods created. Haul-level EM dataset enhanced to provide more accurate mortality estimates.	Nearshore mortality rates updated to include 4 depth bins and N and S of 40'10 deg. N.	New grouping of "Shared Ecosystem Component Species"
2015	Definition of midwater rockfish and midwater hake sectors improved. EM CS fleet discard estimated.	Nearshore rates updated for a variety of species.	New grouping of "Ecosystem Component Species" and changes to "Other fish"/"Other groundfish" grouping
2014	Failed data occurred and were estimated. CVs calculated. EFP displayed separately.	50% mortality rate applied to all Big Skate discard caught using trawl gear	Petrable sole, canary rockfish, widow rockfish declared rebuilt.
2013	Unsampled, unsorted (UNST) hauls occurred and were estimated.		Lingcod split at 40'10 deg. N.
2012		Longnose skate, spiny dogfish mortality rates applied.	
2011	IFQ estimations added.		IFQ management began. ACL, ABC, OFL harvest goals defined.



**Table A-6. In-season adjustments to 2017 west coast groundfish fisheries.**

A complete list of NMFS Public Notices and a complete list of Federal Register Notices can be found at [www.westcoast.fisheries.noaa.gov](http://www.westcoast.fisheries.noaa.gov).  
 Provided by Todd Phillips of the GMT.

<b>Date</b>	<b>Action (with hyperlink to Federal Register Notice)</b>
2/7/2017	<a href="#">82FR9634: Final 2017-2018 groundfish harvest specifications and management measures, effective February 7, 2017</a>
2/23/2017	<a href="#">82FR11419: Proposal to approve changes to the Pacific halibut Catch Sharing Plan for Area 2A for 2017 fisheries; public comments must be received by March 15, 2017</a>
3/8/2017	<a href="#">82FR12922: Reapportionment of tribal Pacific whiting allocation at the end of 2016</a>
3/23/2017	<a href="#">82FR14850: 2017 Tribal Whiting Allocation Proposed Rule and Request for Comments</a>
4/20/2017	<a href="#">82FR18581: Final rule announcing approval of the Catch Sharing Plan and annual management measures for halibut fishing in Area 2A</a>
5/8/2017	<a href="#">82FR21317: Final Rule to Implement 2017 Tribal Whiting Allocation and Fishery Harvest Guideline for Non-tribal Fishery</a>
5/11/2017	<a href="#">82FR21948: Inseason adjustment to incidental halibut retention in the sablefish primary fishery N. of Pt Chehalis; and WA recreational groundfish bag limit changes and removal of the 22 inch lingcod length requirement. Effective May 11, 2017</a>
5/16/2017	<a href="#">82FR22428: Inseason adjustments to sablefish trip limits and to transfer Pacific Ocean perch to the at-sea Pacific whiting coops, effective May 12, 2017</a>
6/20/2017	<a href="#">82FR28012: Correction to 2017 Pacific halibut fishery annual management measures for sport fishery dates in the Columbia River subarea in Area 2A, effective June 19, 2017</a>
7/7/2017	<a href="#">82FR31494: Inseason adjustments to lingcod trip limits and the non-trawl RCA, and transfer of POP and DKBL to the at-sea whiting fishery, effective July 3, 2017</a>
8/23/2017	<a href="#">82FR39977: Proposed Rule; Adjustments to the Pacific Sardine Harvest Guideline Control Rule; public comment period closes September 22, 2017</a>
9/27/2017	<a href="#">82FR44984: Notice of availability; request for comments Pacific Coast Groundfish Fishery Management Plan; Amendment 21-3; Trawl Rationalization Program RIN 0648-BG98</a>
10/4/2017	<a href="#">82FR46209: Advance notice of proposed rulemaking regarding use and accumulation of Catcher Processor permits in the Pacific Coast groundfish fishery. Comments must be received no later than November 3, 2017</a>
10/19/2017	<a href="#">82FR48656: Inseason Adjustments to sablefish trip limits, clarification of lingcod size limit in regs, and depth restrictions for California recreational - Effective October 19, 2017</a>
10/30/2017	<a href="#">82FR50106: Proposed Rule; Amendment 21-3 Change Pacific Whiting At-Sea Sector Darkblotched Rockfish and Pacific Ocean Perch (POP) Allocations to Set-Asides. Comments must be received no later than November 27, 2017</a>
11/9/2017	<a href="#">82FR52040: Information Collection Renewal, West Coast Region Groundfish Trawl Fishery Monitoring and Catch Accounting Program</a>
11/13/2017	<a href="#">82FR52284: Information Collection Renewal, Monitoring Programs for Vessels in the Pacific Coast Groundfish Fishery</a>
11/15/2017	<a href="#">82FR52882: Notice of Receipt of 2018 Trawl Gear and Lingcod Pot Exempted Fishing Permit Applications -- Comments due by November 30, 2017</a>
11/24/2017	<a href="#">82FR55775: Widow Rockfish Reallocation in the Individual Fishing Quota Fishery</a>
12/19/2017	<a href="#">82FR60170: Proposed Rule; Authorization of an Oregon Recreational Fishery for Midwater Groundfish Species. Comments must be received by January 18, 2018.</a>
12/21/2017	<a href="#">82FR60567: Final Rule; Correction to the 2017–18 Biennial Specifications and Management Measures</a>
12/26/2017	<a href="#">82FR60969: Notice of Fee Rate Adjustment, Fishing Capacity Reduction Program for the Pacific Coast Groundfish Fishery</a>
12/29/2017	<a href="#">82FR61752: Notice, 2018 cost recovery fee percentages and mothership cooperative sector pricing.</a>

## Appendix B

### Explicit Retrieval and Processing of PacFIN Data Used in Groundfish Mortality Estimation

The basic protocol we employ using Oracle SQL developer and R software is as follows:

- Run a SQL query to retrieve PacFIN data from 2002 through previous year and output an initial data file (.csv file)
- Post-process the PacFIN data internally
- Utilize post-processed PacFIN data files in analyses and groundfish mortality (GM) reporting

Prior to PacFIN fish ticket data retrieval (from PacFIN website):

Landings can be recorded within the PacFIN system in very general categories consisting of many species, and others not as general but consisting of two or more species. Within the fish-ticket tables, these are known as a fish-ticket market category, or "category" for short. Examples in the PacFIN system are names such as "unspecified slope rockfish", "nominal yellowtail rockfish", and "unspecified small reds rockfish".

These market categories are sampled regularly resulting in proportions that describe the composition of these various categories in terms of the actual species observed. This market category sampling occurs in various ports and for distinct gear-types producing proportions for individual species by port (or port group), gear (or gear group), and month (or quarter). For some PacFIN data sources, area is also a sampling dimension.

The PacFIN system combines monthly summations of market-categories with corresponding species composition proportions to produce the best estimate of catch for individual species where possible. If all possible combinations of market category, gear-type, port, month, and area (where applicable) were actually sampled, then the resulting PacFIN reports/data would contain catch for only individual scientifically defined species. As it is, there are situations that result in unsampled strata and thus, PacFIN reports/data potentially include both individual species as well as market categories.

### Fish Ticket Processing

We selected from all data from 2002 to 2017 from two views created in PacFIN:

WCGOP\_COMPFT\_FEDPERMITS\_V2, which join permits tables to the comprehensive fish ticket table, respectively.

Prior to running the code below, edits are made to the downloaded PacFIN data, including:

- Correcting gear, vessel ID, IFQ landing, ticket date, and removal type fields based on intense QAQC of observer data
- Removing duplicated tickets
- Adding salmon counts based on eTix data
- Incorporating state permit data

Explicit WCGOP post- processing of PacFIN fish ticket data output from query above, as in Figure 1 – Add field YMD and calculate:

$(([\text{YEAR}]) * 10000) + ([\text{MONTH}] * 100) + [\text{DAY}]$

Add field VIDYMD and calculate:  
[DRVID] & [YMD]

Select Tribal landings as PARGRP == 'T'

Assigned sector “Tribal Commercial” and summarized with “Tribal landings”

Select Research landings as REMOVAL\_TYPE == 'R' and IFQ\_LANDING == 'FALSE'

Assigned sector “Commercial Research.”

*Note: Commercial research data are provided by the WCR Office for GM reports, and thus the data from this step is omitted. Further, IFQ trips in early years of the program were often incorrectly identified as research, so we ignore overlap between those two fields.*

Select Non-Research landings as !(REMOVAL\_TYPE == 'R' and IFQ\_LANDING == 'FALSE')

Select fish tickets not identified to an entity/vessel in Non-Research as DRVID == 'MISSING', 'UNKNOWN', or blank

Assigned sector “Non-Identified Vessel/Entity.”

Select fish tickets identified to an entity/vessel in Non-Research as DRVID != 'MISSING', 'UNKNOWN', or blank

Select non-IFQ EFP landings from Non-Research, Vessel ID known as REMOVAL\_TYPE == 'E' and IFQ\_LANDING == 'FALSE'

Assigned sector “Commercial EFP.”

*Note that we ignore the EFP flag where IFQ\_LANDING = 'TRUE' because this field is not always correct. Instead, we use a separate list from PSMFC to identify EM and other EFP tickets under the IFQ program. In 2017, the Gear Modification EFP trip was included in the IFQ Catch Shares program as EM or observed as appropriate.*

2002-2010

If ADJ\_GRID = MDT, summarized with “Non-tribal shoreside hake”

If ADJ\_GRID ≠ MDT, summarized with “Incidental fisheries” or as “EFP”

Select non-EFP and IFQ EFP from Non-Research, Vessel ID known as REMOVAL\_TYPE != 'E' or REMOVAL\_TYPE == 'E' and IFQ\_LANDING == 'TRUE'

Select Individual Fishing Quota (IFQ) landings from Non-Research, Vessel ID known as IFQ\_LANDING == 'TRUE'

Identify hake sector for all IFQ midwater tickets:

Landed ≥ 50% hake on VIDYMD, hake sector = “Midwater Hake”

Landed < 50% hake on VIDYMD, hake sector = “Midwater Rockfish”

Identify non-EM EFP fleet:

If not in EM list from PSMFC:

    If fishing non-midwater, assign sector “Catch Shares”

    If fishing midwater 2011-2014 and observer identified as non-hake trip, assign sector “Catch Shares”

    If fishing midwater 2011-2014 and observer identified as hake trip, assign sector “Shoreside Hake”

    If fishing midwater 2015-forward, assign sector “Midwater Hake” or “Midwater Rockfish” based on hake sector above

If in EM list from PSMFC:

    If fishing non-midwater, assign sector “Catch Shares EM”

    If fishing midwater, assign “Midwater Hake EM” or “Midwater Rockfish EM” based on hake sector field above

Select non-IFQ landings from Non-Research, Non-EFP, Vessel ID known: IFQ\_LANDING == 'FALSE'

Select Gear Group Shrimp trawl landings from non-IFQ that landed more Pink Shrimp (PS) than not, fished with a state PS permit between April and November:

GRGROUP == 'TWS' and PS permit and MONTH in 4-11

    Assign sector “Commercial Shrimp Trawl”

    Summarized as Pink Shrimp

Select Gear Group Shrimp trawl landings from non-IFQ that did not land more Pink Shrimp (PS) than not, did not fish with a state PS permit, and/or fished outside of April to November:

GRGROUP == 'TWS' and no PS permit or MONTH in 1-3, 12

MONTH 1-5  
Select landed ridgeback prawn and no sea cucumber, had state permit, and fished in

    Assign sector “Commercial Prawn Trawl”

Select landed sea cucumber and no ridgeback prawn and had state permit

    Assign sector “Commercial Sea Cucumber Trawl”

Select landed sea cucumber and ridgeback prawn and had both state permits.

    Select landed more ridgeback prawn

    Assign sector “Commercial Prawn Trawl”

    Select landed more sea cucumber

    Assign sector “Commercial Sea Cucumber Trawl”

    Select landed more of anything other than ridgeback prawn or sea cucumber

    Assign sector “Commercial Grgroup Others”

    Summarized with Incidental fisheries

Select did not land ridgeback or sea cucumber

Assign sector “Commercial Grgroup Others”  
Summarized with Incidental fisheries

Select Gear Group Other landings from Non-Research/EFP Commercial:  
(GRGROUP != 'HKL') & (GRGROUP != 'POT') & (GRGROUP != 'TWL') & (GRGROUP != 'TWS')

Assign sector “Commercial Grgroup Others”  
Summarized with “Incidental fisheries”

Select Gear Group Trawl landings from Non-IFQ:  
GRGROUP== 'TWL'

Select Limited Entry permitted:  
PERM1 != ''

Select Midwater:

ADJ\_GRID == 'MDT'

Assign sector “Commercial LE Trawl Midwater”  
2002-2010

Summarized with “Non-tribal shoreside hake”

2011-present

If sector present, indicates an error that needs to be corrected. Often unlabeled

research trip.

Select Non-Midwater:

ADJ\_GRID != 'MDT'

Assign sector “Commercial LE Trawl Non-midwater.”

Select CA halibut:

2002-2006 based on CA halibut weight > 150lb:

(SPID %in% c('CHLB', 'CHL1')) & (LWT\_LBS > 150)

2008-Present based on CA halibut on ticket and vessel carrying a year specific

CA halibut permit and CA halibut weight > 150lb:

(SPID %in% c('CHLB', 'CHL1')) & (LWT\_LBS > 150) & (DRVID %in%  
unique(FT.perm\$DRVID))

Assign to as “LE CA Halibut”

For non-CA halibut:

Likely permit was not used for given landing. Assign to “Commercial OA Trawl  
Non-Midwater” and summarized with “Incidental fisheries”

Select Non-LE permitted (Open Access):  
PERM1 == ''

Select Midwater:

ADJ\_GRID == 'MDT'

Assign sector "Commercial OA Trawl Midwater."

Summarized with "Incidental fisheries"

Select Non-Midwater:

ADJ\_GRID != 'MDT'

Assign sector "Commercial OA Trawl Non-midwater."

Select CA halibut:

2002-2006 based on CA halibut weight > 150lb:

(SPID %in% c('CHLB', 'CHL1')) & (LWT\_LBS > 150)

2007-Present based on CA halibut on ticket and vessel carrying a year specific

CA halibut permit

(SPID %in% c('CHLB', 'CHL1')) & (DRVID %in%

unique(FT.perm\$DRVID))

Assign to "OA CA Halibut"

Select non-OA CA Halibut

Select landed ridgeback prawn and no sea cucumber, had state permit, and fished in

MONTH 1-5

Assign sector "Commercial Prawn Trawl"

Select landed sea cucumber and no ridgeback prawn and had state permit

Assign sector "Commercial Sea Cucumber Trawl"

Select landed sea cucumber and ridgeback prawn and had both state permits.

Select landed more ridgeback prawn

Assign sector "Commercial Prawn Trawl"

Select landed more sea cucumber

Assign sector "Commercial Sea Cucumber Trawl"

Select landed more of anything other than ridgeback prawn or sea cucumber

Assign sector "Commercial OA Trawl Non-midwater"

Summarized with Incidental fisheries

Select any remaining

Assign sector "Commercial OA Trawl Non-midwater"

Summarized with "Incidental fisheries"

Select Gear Group Fixed Gear landings from Non-IFQ/Research/EFP Commercial:

(GRGROUP == 'HKL') | (GRGROUP == 'POT')

Select Nearshore Species on FT:

SPID %in% c('BLCK', 'BLK1', 'RCK9', 'RCK7', 'RCK2', 'BYEL', 'BYL1', 'BLU1', 'BLUR',  
'BRW1', 'BRWN', 'CLC1', 'CLCO', 'SCOR', 'SCR1', 'CHN1', 'CHNA', 'COP1', 'COPP', 'GPH1',

'GPHR', 'GRAS', 'GRS1', 'KLP1', 'KLPR', 'OLV1', 'OLVE', 'QLB1', 'QLBK', 'TRE1', 'TREE', 'NSHR', 'NUSR', 'SSHR', 'SUSR', 'USHR', 'CBZ1', 'CBZN', 'KGL1', 'KLPG', 'SHPD', 'SHP1', 'UDNR', 'SSRS', 'SSRD', 'BISC', 'BSCL', 'RSCL', 'UGLG')

Compile unique vessel-landing date (VIDYMD) values for those FTs with Nearshore Species.

Retrieve all FTs (and all FT line items) for those VIDYMD values (so obtaining **all** fish tickets for a vessel's landing date if one or more of the vessels fish tickets on that date had a nearshore species recorded on it).

2002-2003

If not landed in WA, assign to Nearshore

2004-present

If not landed in WA and had active Nearshore permit for given year, assign o Nearshore

Of the Remaining Non-Nearshore Fixed Gear landings:

1. Create a catch variable for Groundfish (based on a GF\_ID in a separate file maintained by WCGOP), and summarize RWT\_LBS of groundfish and non-groundfish for each unique VIDYMD.

If weight of non-sablefish groundfish weight is greater than non-groundfish weight in a unique fishing day for a vessel (VIDYMD), included in Fixed Gear Sablefish Landings  
GFLB.Sum >= NonGFLB.Sum

2. Select all VIDYMD if Sablefish is a line item of catch on a FT:  
SPID == 'SABL'
3. Compile unique VIDYMDs that fit either criteria of 1. Sablefish landings or 2. groundfish greater than non-groundfish.

Retrieve all FT line items for those VIDYMD values.

(See next section for more processing of these Fixed Gear Sablefish Landings).

Remaining not identified in Step 3. are Non-Nearshore, Non-Sablefish Fixed Gear landings:

Select Limited Entry permitted:

PERM1 != ''

Select if Tier Endorsed:

SABL1 != 0 | SABL2 != 0 | SABL3 != 0 | SABL4 != 0

Assign sector "Commercial Fixed-Gear Non-Nearshore Non-Sablefish LE Tier"

Select if Not Tier Endorsed:

SABL1 == 0 & SABL2 == 0 & SABL3 == 0 & SABL4 == 0  
Assign sector “Commercial Fixed-Gear Non-Nearshore Non-Sablefish LE  
0Tier”

Select Non-LE permitted (Open Access):  
PERM1 == ''  
Assign sector “Commercial Fixed-Gear Non-Nearshore Non-Sablefish OA”

Summarize with “Incidental fisheries”

Fixed Gear Sablefish landing FTs (see above for initial Steps 1-3 to identify):

Select Limited Entry permitted:  
PERM1 != ''  
Assign sector “Commercial Fixed-Gear LE Sablefish.”

Select if Tier Endorsed:  
SABL1 != 0 | SABL2 != 0 | SABL3 != 0 | SABL4 != 0  
(See below for additional steps)

Select if Not Tier Endorsed:  
SABL1 == 0 & SABL2 == 0 & SABL3 == 0 & SABL4 == 0

Select if Pot gear (LE 0 tier cannot fish pot gear, so thus OA) :  
GRGROUP == 'POT'  
Assign sub-sector “ Sable OA.”  
Summarize with “Non-nearshore fixed gear” (and “OA Fixed Gear” prior)

GRGROUP != 'POT'  
Assign sub-sector “LE 0 Tier.”  
Summarize with “Non-nearshore fixed gear” (and “LE Non-primary”  
prior)

Select Non-LE permitted (Open Access):  
PERM1 == ''  
Assign sector “Commercial Fixed-Gear OA Sablefish.”  
Assign sub-sector “ Sable OA.”  
Summarize with “Non-nearshore fixed gear” (and “OA Fixed Gear” prior)

For LE Tier Endorsed FTs, to determine if

- a.) landings are assigned to the primary fishery (Primary Season Attaining Quota),
- b.) landings were made in the non-season fishery (Non-season DTL), or
- c.) if the vessel fished in the primary season but had already reached their tier limit and landings should be assigned to the DTL fishery (Primary Season Reached Quota DTL).



Select if definitely non-primary season (with 5 days buffer at end of the season to evaluate those FTs at the “borderline” which could fall into either primary or non-season):

(MONTH < 4) | (MD > 1105)

Note: MD is a concatenated field with Month and Day

Assign sub-sector “LE SAB NonPSeason.”

Summarize with “Non-nearshore fixed gear” (and “LE Non-primary” prior)

Select if primary season (with 5 days buffer at end of the season to evaluate those FTs at the “borderline” which could fall into either primary or non-season):

(MONTH >= 4) & (MD <= 1105)

Year	Tier 1 Quota (lbs)	Tier 2 Quota (lbs)	Tier 3 Quota (lbs)	DTL Max Landing (lbs)	Federal Register Reference
2002	36000	16500	9500	1050	67FR10490
2003	53000	24000	14000	1050	68FR11182
2004	64300	29200	16700	1050	69FR11064
2005	64000	29100	16600	1050	69FR77012
2006	62700	28500	16300	1050	69FR77012
2007	48500	22000	12500	1050	71FR78638
2008	48500	22000	12500	1050	71FR78638
2009	61296	27862	15921	1000	73FR80516
2010	56081	25492	14567	3000	73FR80516
2011.1	41379	18809	10748	2000	76FR11381
2011.2	47697	21680	12389	2000	76FR34910
2012	46238	21017	12010	1800	76FR77415
2013	34513	15688	8964	1880	78FR49190
2014	37441	17019	9725	2000	78FR580
2015	41175	18716	10695	2000	80FR12567
2016	45053	20479	11702	1275	80FR12567
2017	45120	20509	11720	1275	82FR9634

Order multiple landings on a day from greatest sablefish landing to smallest sablefish landing to ensure consistent results across different years of analysis

Add field SABL1\_Lim, SABL2\_Lim, SABL3\_Lim and calculate using year-specific tier limits:

For 2002-present except 2011 (repeated for each sabletier undelimited data field; SABL1, etc.):

SABL1\_Lim [ which(SABL == 1) ] = Tier1Quota

SABL2\_Lim [ which(SABL == 2) ] = Tier2Quota

SABL3\_Lim [ which(SABL == 3) ] = Tier3Quota

For 2011 – tier limits were increased mid-season, taking effect on June 11th:

SABL1\_Lim [ which((SABL == 1) & (MD < 0611)) ] = Tier1Quota for 2011a  
SABL2\_Lim [ which((SABL == 2) & (MD < 0611)) ] = Tier2Quota for 2011a  
SABL3\_Lim [ which((SABL == 3) & (MD < 0611)) ] = Tier3Quota for 2011a

SABL1\_Lim [ which((SABL == 1) & (MD >= 0611)) ] = Tier1Quota for 2011b  
SABL2\_Lim [ which((SABL == 2) & (MD >= 0611)) ] = Tier2Quota for 2011b  
SABL3\_Lim [ which((SABL == 3) & (MD >= 0611)) ] = Tier3Quota for 2011b

Add field QUOTA and calculate:

[SABL1\_Lim] + [SABL2\_Lim] + [SABL3\_Lim]

Add field SABL\_LND and for weight of sablefish landings for each line:

SABL\_LND = 0

SABL\_LND [ which(SPID == 'SABL') ] = RWT\_LBS[ which(SPID == 'SABL') ]

Select out just those FT line items with Sablefish:

SPID = 'SABL'

Add field CUMSABL and calculate the cumulative sablefish weight landed by a vessel (each fish ticket line item of sablefish weight gets added up over time to see how the vessel's sablefish landings move toward attaining their total quota limit).

Add field PROPORTION and calculate the proportion of sablefish weight caught relative to their total tier quota weight:

[CUMSABL] / [QUOTA]

Select if the vessel is over their tier quota:

PROPORTION >1

Select by criteria (for the DTL sectors) – (see Notes):

(PROPORTION >1.15 AND SABL\_LND <1880”DTL Max from above”) OR YMD  
>20131105

*Notes: To place fish tickets into the DTL sector (either as Primary Season Reached Quota DTL or Non-season DTL) vs. Primary Season Attaining Quota sector. There is a “cushion” of sablefish quota overage weight (proportion > 1.15) allowed when the vessel has supposedly reached their quota, but in addition, the landed weight is reviewed in the context of the maximum DTL landing limit per week allowable for sablefish in the LE DTL sector during the entire year. The additional fish tickets that were included in this review for the month of November, after Nov 5<sup>th</sup> are all considered part of the Non-season DTL fishery.*

<http://www.ecfr.gov/cgi-bin/retrieveECFR?gp=1&SID=bb88f96b71fbcd29bd5bf1f7091a385c&h=L&n=50y13.0.1.1.1&r=PART&ty=HTML#50:13.0.1.1.1.5.1.10>

- “A vessel's primary season cumulative limit(s) are considered to be taken when the total amount remaining is less than the daily trip limit for sablefish north of 36° N. lat., if one is specified, in Table 2 (North) and Table 2 (South) to this subpart.”

Compile unique FTID values for the FTs selected in the “Select by criteria” step above.

Retrieve all FT line items for those FTID values (for the DTL sectors).

Assign sub-sector “LE SAB DTL.”

Summarize with “Non-nearshore fixed gear” (and “LE Non-primary” prior)

Remaining are Sablefish Primary Season Attaining Quota landings.

One more step is used to place these into season vs. non-season landings.

Select if in Primary Season:

"YMD" < 20131101

Assign sub-sector “LE SAB Primary.”

Summarize with “Non-nearshore fixed gear” (and “LE Sablefish Primary” prior)

Select if outside Primary Season (non-season):

"YMD" >= 20131101

Assign sub-sector “LE SAB NonPSeason.”

Summarize with “Non-nearshore fixed gear” (and “LE Non-primary” prior)

All data segments are combined together to re-produce the original dataset. If a SubSector value was not designated in the processing above, it is given the value from the SECTOR field.

All additional data processing steps that were applied during the discard estimation process are described in the methods section of the groundfish mortality report. Of these, specific identification and removal of commercial directed Pacific halibut fixed gear landings is as follows:

If SubSector equals 'Sable OA', 'LE 0 Tier', 'LE SAB NonPSeason', 'LE SAB DTL', 'LE SAB Primary'

For 2002-2016: If listed by the International Pacific Halibut Commission (IPHC) as a PHLB Derby ticket, summarize with “PHLB Derby”

For most recent year of data, IPHC’s list is not yet available, and the IPHC does not currently track PHLB Derby landings in California. In the most recent year, for all states, if FTID had recorded PHLB catch landed on one of the specific calendar year 10 hour openings, plus two days post (to allow for any subsequent deliveries)

Summarize with “PHLB Derby”

2017:

((MONTH == 6) & (DAY %in% 28:30)) |

((MONTH == 7) & (DAY %in% 12:14)) |

((MONTH == 7) & (DAY %in% 26:28))

In addition, California FTID had recorded PHLB catch landed on one of the specific calendar year 10 hour openings, plus two days post (to allow for any subsequent deliveries)

2016:

((MONTH == 6) & (DAY %in% 21:23)) |  
((MONTH == 7) & (DAY %in% 5:7)) |  
((MONTH == 7) & (DAY %in% 19:21)) |

2015:

((MONTH == 6) & (DAY %in% 23:25)) |  
((MONTH == 7) & (DAY %in% 7:9)) |

2014:

((MONTH == 6) & (DAY %in% 25:27)) |  
((MONTH == 7) & (DAY %in% 9:11)) |

2013:

((MONTH == 6) & (DAY %in% 26:28)) |  
((MONTH == 7) & (DAY %in% 10:12)) |

2012:

((MONTH == 6) & (DAY %in% 27:29)) |  
((MONTH == 7) & (DAY %in% 11:13)) |

2011:

((MONTH == 6) & (DAY %in% 29:30)) |  
((MONTH == 7) & (DAY == 1)) |  
((MONTH == 7) & (DAY %in% 13:15)) |  
((MONTH == 7) & (DAY %in% 27:29)) |  
((MONTH == 8) & (DAY %in% 10:12)) |  
((MONTH == 8) & (DAY %in% 24:26)) |  
((MONTH == 9) & (DAY %in% 7:9)) |  
((MONTH == 9) & (DAY %in% 21:23)) |

2010:

((MONTH == 6) & (DAY %in% 30:31)) |  
((MONTH == 7) & (DAY %in% 1:2)) |

2009:

((MONTH == 6) & (DAY %in% 24:26)) |  
((MONTH == 7) & (DAY %in% 8:10)) |

2008:

((MONTH == 6) & (DAY %in% 11:13)) |  
((MONTH == 6) & (DAY %in% 25:27)) |  
((MONTH == 7) & (DAY %in% 9:11)) |  
((MONTH == 7) & (DAY %in% 23:25)) |

2007:

((MONTH == 6) & (DAY %in% 27:29)) |  
((MONTH == 7) & (DAY %in% 11:13)) |  
((MONTH == 7) & (DAY %in% 25:27)) |  
((MONTH == 8) & (DAY %in% 8:10)) |

2006:

((MONTH == 6) & (DAY %in% 28:30)) |

```

((MONTH == 7) & (DAY %in% 12:14)) |
((MONTH == 7) & (DAY %in% 26:28)) |
2005:
((MONTH == 6) & (DAY %in% 29:30)) |
((MONTH == 7) & (DAY == 1)) |
((MONTH == 7) & (DAY %in% 13:15)) |
((MONTH == 7) & (DAY %in% 27:29)) |
((MONTH == 8) & (DAY %in% 10:12)) |
2004:
((MONTH == 6) & (DAY %in% 23:25)) |
((MONTH == 7) & (DAY %in% 14:16)) |
((MONTH == 7) & (DAY %in% 28:30)) |
((MONTH == 8) & (DAY %in% 11:13)) |
2003:
((MONTH == 6) & (DAY %in% 25:27)) |
((MONTH == 7) & (DAY %in% 9:11)) |
((MONTH == 7) & (DAY %in% 23:25)) |
((MONTH == 8) & (DAY %in% 6:8)) |
2002:
((MONTH == 6) & (DAY %in% 26:28)) |
((MONTH == 7) & (DAY %in% 10:12)) |
((MONTH == 7) & (DAY %in% 24:26))

```

## Trawl Logbook Processing

Logbook data are downloaded from a view in PacFIN that incorporates logbook data and permit information: `pacfin.lbk_codemb0310multiftiddelim`

Data from 2002-2010 are used in estimations of discard for the LE trawl fleet. Data from 2011-present are sometimes used for effort estimations when observer data is unavailable because a trip was monitored using an electronic system.

### Explicit WCGOP post- processing of PacFIN logbook data output from query above

Select Puget Sound landings:

```
"PSGRNDCODE" <> 0
```

Select Non-Puget Sound (Ocean) landings:

```
"PSGRNDCODE" =0
```

Select Midwater:

```
"GRID" = 'MDT'
```

Select Non-Midwater:

```
"GRID" <> 'MDT'
```

Select Limited Entry permitted:  
"PERMID\_1" <> ''

Select Non-LE permitted (Open Access):  
"PERMID\_1" = ''

Note: LE Non-midwater logbook data is further delineated into the state California halibut trawl fishery for each individual tow/haul as follows –

- a.) if tow target is California halibut (PACFIN\_TARGET = CHLB or CHL1) or
- b.) tow target PACFIN\_TARGET = (NSM or OFLT or SSOL or SSO1) AND DEPTH1 < 30 (fm) AND SET\_LAT < 40.16667.

The remaining LE non-midwater logbook data tows are considered part of the LE groundfish trawl fishery.

Additional data processing steps are described in each report and product.